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TUBERCULOSIS

AS A DISEASE OF THE MASSES AND HOW TO COMBAT IT

SEVENTH AMERICAN EDITION
ENLARGED AND REVISED
WITH 64 ILLUSTRATIONS

Motto: To combat consumption as a disease of the masses successfully requires the combined action of a wise government, well trained physicians, and an intelligent people

PRIZE ESSAY

BY

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PREFACE TO THE SEVENTH AMERICAN EDITION

When it was my good fortune ten years ago to be the recipient of the international tuberculosis prize for an essay submitted in competition, I had no thought that this little volume would receive the recognition which has been bestowed upon it in the course of a decade. The German Government has had several editions printed, and many hundred thousand copies were distributed gratuitously or at cost throughout the empire. Through the initiative of other governments, medical associations, or individuals, the essay has been translated into nearly all European languages and into a few Asiatic ones. The list on page 2 shows that it has appeared in twenty-seven foreign editions and nearly as many different languages.

I desire to express herewith my most heartfelt appreciation of the gratifying reception the essay has received. In America and Canada, thanks to the interest of the health officials and presidents and secretaries of tuberculosis societies and committees, the book certainly has had an unusually wide circulation. To my distinguished colleagues in America, Europe, Asia and India, who have honored me so highly by translating the essay into their native tongues, I wish to express my most heartfelt thanks. I know that for many of them it has been a labor of love and that no financial benefit has ever accrued to them from it. May they receive their reward in the realization that by their co-operation in the anti-tuberculosis crusade in their native tongue and country, the cause has been furthered and their countrymen benefited.

The author's translation into English of the original German essay has undergone six different editions, so that to-day I am privileged to offer to the people of the United States the Seventh American Edition. Although in every one of these editions there were some changes or additions, the present one must, by reason of the wonderful progress in antituberculosis work during the past decade, differ materially from its predecessor of nine years ago.

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The present edition is, of necessity, much larger and more profusely illustrated. While the 1901 edition had 86 pages, 30 chapters, and 23 illustrations, the 1911 edition has 124 pages, 34 chapters, and 64 illustrations. For brevity's sake I have omitted the prefaces of the 2d, 3d, 4th, 5th, and 6th editions. I had referred in them to the gradual progress of anti-tuberculosis work which, however, need not now be related, since the changes in the text speak for the progress. For the benefit of my new readers I must again explain what I had mentioned in one of the prefaces of a former edition, namely, why it is that this essay has not been published by one of the well-known firms handling medical and popular scientific books. The reason is the following: I have insisted from the first to the present edition that the book should be put on the market at retail for 25 cents for the paper-bound, at 50 cents for the cloth-bound copies, and at wholesale correspondingly cheaper. This low price did not insure sufficient remuneration to the various publishing houses to which I applied. There are enough good books on tuberculosis in the market costing one, two, three, and five dollars, intended for the layman of means; but for the masses who need the information most there are very few to be had at a price within their reach. I had the choice of having the book put on the market at a price far too high for the purpose it was intended for, or of abandoning its publication. In my dilemma I appealed to a former secretary of mine, who undertook the publication of the first editions, and now I have been fortunate enough to interest Professor Edward T. Devine, the editor, and Mr. Arthur P. Kellogg, the business manager of the *Survey*, the official organ of the New York Charity Organization Society, in the publication of the essay. As a result of this kind co-operation I am able to continue to have the book published and sold at this low price, notwithstanding the increased size of the volume. Through the medium of the Publication Department of the *Survey*, thousands of copies of previous editions have already been distributed throughout the United States.

To the many friends of the anti-tuberculosis cause in this country and abroad who are known to me, and to the equally large number whom I have not yet the privilege of knowing, I want also to express my thanks for the encouragement and inspiration which they have given me in my work, and for the numerous kind messages transmitted to me or expressed in various medical or lay journals, pamphlets, and circulars.

May their reward be the one for which I am trying to labor, the blessing of having served in the holy cause of the successful combat of the Great White Plague. May the Seventh American Edition of "Tuberculosis as a Disease of the Masses and How to Combat It," help toward the attainment of this goal.

I believe this preface cannot be concluded better than by adding a message from that great master of tuberculosis science, the late Professor Robert Koch, expressing his views on the value of educating the masses regarding the prevention of tuberculosis. In his last letter to me, written a few months before his death, he said: "Popular works on tuberculosis are destined to play an important part in the enlightenment of the people, and the American people seem to me particularly susceptible to such education."

May we prove worthy of the gracious compliment paid to us by that immortal scientist and greatest physician of his time.

S. A. Knopf.

New York, April, 1911.

PREFACE TO THE GERMAN EDITION

(By Geh. Med.-Rath Professor B. FRÄNKEL, of Berlin, Germany, setting forth the conditions under which the prize was awarded.)

At the meeting of the "International Congress for the Study of the Best Way to Combat Tuberculosis as a Disease of the Masses" which convened at Berlin, May 24–27, 1899, the sum of 4,000 marks was donated by two Berlin merchants, lay members of the Congress, as a prize to be offered for the best essay on the subject "Tuberculosis as a Disease of the Masses and How to Combat it" ("Die Tuberkulose als Volkskrankheit und deren Bekämpfung").

The Congress decided on the following regulations concerning this prize:

1. The best popular essay on the subject "Tuberculosis as a Disease of the Masses and How to Combat It," comprising not more than eighty, and not less than forty-eight printed pages shall receive the prize of 4,000 marks. In case the jury of the prize committee should decide that two essays deserve the prize, the best may receive 3,000 marks, and the second best 1,000 marks. Or, should the decision of the judges find two essays of equal value, each shall receive 2,000 marks.
2. The following gentlemen have consented to act as judges: Geheimrath Prof. Dr. B. Fränkel; Geheimrath Prof. Dr. Gerhardt; Kapitän z. S. Harms; Wirkl. Geh. Ober Reg.-Rath Präsident Köhler; Generalarzt Prof. Dr. von Leuthold, Excellenz; Geheimrath Prof. Dr. von Leyden; Freiherr Dr. Lucius von Ballhausen, Excellenz; Geheimrath Dr. Naumann; Oberstabsarzt Dr. Pannwitz; Dr. Graf von Posadowsky-Wehner, Excellenz; Se. Durchlaucht der Herzog von Ratibor.
3. All essays must be sent by December 1, 1899, to Privy-Councillor Prof. Dr. B. Fränkel, 4 Bellevue Strasse, Berlin, and each essay must bear a motto, selected by the writer, who shall insert his name within a sealed envelope having the motto on the cover.
4. The essay, or essays (see §1), to which has been awarded the prize, become the property of the "German Central

Committee for the Erection of Sanatoria." The latter will take upon itself the printing of the essay and the least expensive method of distribution.

5. The decision of the judges is to be announced through the public press.

The foregoing regulations were published in the medical and lay papers, and as a result eighty-one essays were received by December 1st. The essays were distributed among the judges with the request to select from them such as were deserving of closer examination. The judges recommended twenty-six for that purpose.

The fifty-five rejected essays were once more examined by the undersigned and his assistants, Drs. Edmund Meyer, Alexander, Finder, Claus, and Elwert, but these gentlemen could not recommend any of the fifty-five essays for further consideration.

At the meeting of the jury on February 25, 1900, under the presidency of his Serene Highness the Duke of Ratibor, it was decided that the twenty-six selected essays should be once more carefully examined by Drs. Fränkel, Gerhardt, Harms, Köhler, von Leuthold, von Leyden, Freiherr von Lucius, and Pannwitz, and the result was that three were ultimately selected for closer choice.

At the next meeting of the judges, on June 15th, it was decided to form a sub-committee composed of Drs. Fränkel, Gerhardt, Harms, Köhler, and Pannwitz to decide upon final action. After careful consideration this committee came to the conclusion that the work bearing the motto,

"To combat consumption successfully requires the combined action of a wise government, well-trained physicians, and an intelligent people."

so much surpassed all the others in excellence, that it should be awarded the Congress prize. It was then found that Dr. S. A. Knopf, of New York, was the author of this work.

A few changes, as recommended by the judges, were accepted by Dr. Knopf, and have been incorporated in the present work.

At a subsequent meeting of the German Central Committee it was resolved to publish this essay and arrange for its widest distribution.

Professor B. Fränkel.

Berlin, October 1, 1900.

PREFACE TO THE FIRST AMERICAN EDITION

In presenting to the English-speaking world, and particularly to the people of the United States, a translation of the essay originally written in German, the author desires to state that, while having endeavored to make as exact a translation as possible, he found it necessary to change several passages, making some additions and omissions. His reasons for having done so will be obvious to all who have studied pulmonary tuberculosis or consumption, not only in its medical, but also in its sociological aspects, and who will bear in mind the fact that the habits and laws of nations differ, and that in a popular essay it is absolutely necessary to take these differences into account. Thus, for example, it was even necessary before the original German essay could appear in print, that the author should consent to make certain changes bearing on the social situation of consumptives belonging to the laboring class in Germany. These changes were suggested in detail by the judges who awarded the prize. With a generosity which cannot be lauded too highly, these gentlemen did not expect to find in the essays, submitted to them for competition from all over the world, a complete knowledge of the labor legislation, of the sanitary laws and tuberculosis regulations which are now in vogue in the German empire, nor did they expect the essayists to be familiar with local conditions to the extent of knowing all that would or would not be practicable in the carrying out of suggestions to prevent the spread or the development of tuberculous diseases.

The social conditions in Germany differ very much from those in the United States, and the author felt it his duty to speak in this American edition of all the important points bearing directly on the question of tuberculosis as a "social disease" in America. The evils of alcoholism, of child-labor, of the overcrowding of tenement houses and of unsanitary dwellings of the poor in general, of overwork and unsanitary factories, also some of the causes of malnutrition or underfeeding of the laboring classes, are treated as fully as the nature of such an essay permits.

As an example of the necessity of making certain changes in this work, intended for an American public, I may be permitted to state the following: in Germany every laboring man

and woman must be insured against old age, accident, and disease, including tuberculosis, and the employer is held responsible for the compliance with this law. No such law exists in the United States, and most of the private insurance companies avoid accepting policy-holders with a seeming tendency toward the development of tuberculosis. As another illustration of the vastly different conditions here and in Germany regarding our subject, we must consider that every one of the forty-seven States of the Union has its own sanitary laws and regulations. They differ widely in rigor and completeness in regard to the prevention of tuberculosis in man as well as in beast. In Germany there is one homogeneous law for all the states and provinces; there is a ministry for "Medizinal Angelegenheiten" (medical affairs) with a cabinet officer at the head, who has for his advisers the highest medical authorities connected with the "Reichs-Gesundheitsamt" (Imperial department of health). I hope the time is not far distant when our own beloved country will have a similar institution; when all the State, county, and city boards of health will look to Washington, the seat of the future United States National Department of Health, of which the Secretary shall be a member of the President's Cabinet, as their supreme head and guide in medical and sanitary matters. In the meantime let us labor as best we can, as individuals, laymen, and physicians; let each State, county, and city board of health do its best toward an intelligent, rigorous, and yet not too oppressive public prophylaxis of human and bovine tuberculosis; and let the people at large lend a willing hand in this combat against our common foe, the "Great White Plague."

S. A. Knopf.

16 West Ninety-fifth Street, New York, January, 1901.

INTRODUCTION

Tuberculosis has been called a disease of the masses on account of its great prevalence among all classes of people. It has been known for hundreds of years as the most feared, most prevalent, and, alas! also as the most fatal of all diseases. Hippocrates, the most celebrated physician of antiquity (460 to 377 B.C.), and the father of scientific medicine, described pulmonary tuberculosis or consumption as the disease which is "the most difficult to treat, and which proves fatal to the greatest number." In the middle ages (1550) the celebrated physician Montano declared consumption to be one of the most dangerously contagious and most easily contracted of diseases. An equally strong advocate of the theory of contagion was the celebrated anatomist Morgagni (1682–1771), who never performed an autopsy on an individual who had died from tuberculosis. Toward the end of the eighteenth century the sanitary authorities of some cities of Italy and France considered consumption a highly infectious and contagious disease, and a French medical author of the name of Janett de Langrois reports that the municipal authorities of Nancy had caused the furniture and bedding of a woman, who had died from consumption, to be destroyed by fire. The contagion in this case had apparently been demonstrated, inquiries revealing that the deceased woman had slept frequently with a consumptive girl friend until she finally succumbed to the same disease. History.

In Naples a royal decree, dated September 20, 1782, ordered the isolation of consumptives and the disinfection of their apartments, personal effects, furniture, books, etc., by means of vinegar, brandy, or lemon juice, sea-water, or fumigation. Any violation of this law was punished, if the individual was an ordinary mortal, with three years in the galleys, and if he happened to be a nobleman he was sent for the same time to the fortress and had to pay 300 ducats. The physician who failed to notify the authorities of the existence of a tuberculous patient was fined 300 ducats for the first offence, and a repetition of the neglect would banish him from the country for ten years. According to Portal (1742–1832), there was

a law in Spain and Portugal which obliged the parents or nearest relative of a consumptive to notify the authorities when the patient had arrived at the last period of the disease. This was done for the purpose of making sure of the disinfection of the personal effects of the patient after his death.

In the first half of the nineteenth century little attention was paid to the theory that tuberculosis was infectious, even by medical men. The contagiousness or communicability of the

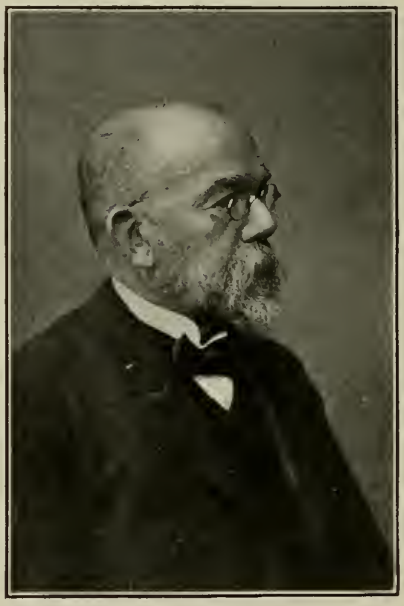

Fig. 1.—Robert Koch (Dec. 11, 1843,–May 27, 1910), Discoverer of the Tubercle Bacillus.

disease could not be scientifically demonstrated, and although there were physicians here and there who believed in the infectiousness of the disease, nothing positive was taught in regard to it at the centres of medical learning.

At last, in 1865, the French physician Villemin demonstrated beyond a shadow of doubt that tuberculosis could be transmitted from one individual to another. He inoculated animals with tuberculous substances and reproduced tuberculosis not only in the lungs but also in other portions of the body. Since this discovery and its verification by numerous experimenters, such as Cohnheim, Welch, Prudden, Straus,

and others, it has been generally acknowledged that tuberculosis is an infectious disease, and that for its production a specific germ is essential. The discovery of this specific organism (bacillus of tuberculosis) was reserved to the great German scientist Robert Koch (1882). He demonstrated the presence of this germ as the specific cause of all tuberculous lesions on March 24, 1882, before a brilliant assembly of medical men in Berlin. The death of this great physician and benefactor of mankind, which occurred May 27, 1910, has indeed been a great loss not only to the antituberculosis cause but to the whole field of preventive medicine.

Consumption is an endemic disease, that is to say, habitually prevalent, and it exists in all civilized countries. Wild tribes and less civilized people succumb to the disease, as a rule, very rapidly as soon as they come in contact with civilization. The proof of this we might find among the North American Indians and among the Negroes and their descendants now living in the United States. According to the recent report of the Board of Health of Toronto (Canada), pulmonary tuberculosis is dangerously prevalent among the Blood Indians of the Dominion of Canada. Of every hundred deaths which occur among this tribe, twenty-three are due to consumption. Since these Indians are kept on a reservation under the supervision of the Canadian Government, these statistics should be considered reliable.

The mortality from tuberculosis among the colored population of the United States is alarmingly high. According to mortality statistics by the United States Bureau of the Census in 1910, the number of deaths from all forms of tuberculosis per 100,000 in Washington, D. C., in 1908 was 166.9 among the white population and 477.5 among the colored. However, let us state right here that the cause of the increased mortality among Indians and Negroes is to be ascribed not to the blessings of civilization, but rather to the vices, such as overcrowding, alcoholism, and excesses of all kinds, which, alas! too often accompany civilizing agents.

Mortality Statistics.

There have been so many statistics published concerning the general mortality from tuberculosis in the United States and Europe, that we do not think it necessary to reproduce in detail any of the published tables, but will content ourselves with some general statements. It is now universally admitted that tuberculosis is the most frequent cause of death. According to some statistics every seventh, according to others

every sixth, death is due to tuberculosis in one form or other. The mortality from tuberculosis in the United States is variously estimated at from 150,000 to 200,000 annually. The lower figure is probably the more correct one. Some statisticians claim that throughout the civilized world at least one individual dies every second of tuberculosis, and in the United States it is estimated that we lose one citizen every four minutes from this disease. The greatest number of deaths are due to the pulmonary form of tuberculosis, commonly known as consumption. Depressing as these figures seem, they still indicate progress, for formerly they were still higher, and we have now absolute evidence that the mortality from tuberculosis has been considerably decreased in nearly all the cities and towns of Europe and the United States, where better preventive measures and more rational methods of treatment have been in vogue for a number of years. In one of the succeeding chapters we shall speak more in detail of public prophylaxis and special institutions for the treatment of consumptives, which doubtlessly have been the most important factors in producing this reduction in the mortality from tuberculosis.

The researches of recent years have demonstrated that consumption and also many other forms of tuberculosis may not only be prevented, but can in many cases be arrested and lastingly cured. The governments and the medical profession are aware of this, and have diligently, energetically, and most unselfishly worked in the direction of solving this important problem, which means so much to the welfare of the people. In one of the subsequent chapters we will give a short review of the antituberculosis activities throughout the world, and particularly in the United States. From it it will be seen that all civilized governments as well as the medical profession are in earnest to combat tuberculosis in every possible way.

But, as the motto of this essay expresses it, the intelligent co-operation of the people in this work is indispensable. To enable all men, women, and even the children at school to participate intelligently in this combat against a common foe is the purpose of this essay.

CONTENTS

PAGE

PREFACE TO THE SEVENTH AMERICAN EDITION 3
PREFACE TO THE GERMAN EDITION 7
PREFACE TO THE FIRST AMERICAN EDITION 9
INTRODUCTION 11

CHAPTER

I. What is Consumption? 19
II. How May the Germ of Consumption (Bacillus Tuberculosis) Enter the Human System? 20
III. How Does the Inhalation of the Bacilli Take Place? . . 20
IV. What Must Be Done to Check the Spread of Consumption Caused by the Expectoration of Pulmonary Invalids? . 21
V. What Can Be Done as a Protection Against Droplet Infection? 31
VI. What Should the Home Hygiene Be in the Rooms of the Tuberculous, or in any Home in Order that Tuberculosis May not Develop or Spread? 33
VII. How Can We Guard Against Germs of Tuberculosis in Our Food? 34
VIII. In What Other Ways May the Bacilli or Germs of Consumption Enter the Intestinal Tract? 35
IX. How May Tuberculosis be Contracted through Inoculation (Penetration of Tuberculous Substance through the Skin)? 36
X. What Other Forms of Tuberculosis Exist, and What Are Their Principal Symptoms? 38
XI. What Protects the Healthy Individual from Contracting Tuberculosis? 40
XII. How May a Hereditary Disposition to Consumption be Successfully Overcome? 40
XIII. How Can a Predisposition to Tuberculosis be Acquired When it is not Inherited? 54
XIV. How May an Acquired Predisposition be Overcome, and Unhealthful Occupations Made Relatively Harmless? . . 56
XV. What Can Well-Meaning and Conscientious Employees in City and Country Do to Help Combat Tuberculosis? . . . 57
XVI. What Can the Farmer and Dairyman Do to Diminish the Frequency of Tuberculosis Among Animals, and Thus Indirectly Stop the Propagation of the Disease Among Men? 60
XVII. What Are the Occupations in Which Tuberculous Invalids, Even in the First Stages of the Disease, Should not be Employed? 62
XVIII. What Are the Main Signs and Symptoms of the Beginning of Consumption or Tuberculosis of the Lungs? . . . 63
XIX. What Are the Early Symptoms of Other Forms of Tuberculosis? 65
XX. How Can Infants and Small Children Be Protected from Contracting Scrofula and Other Forms of Tuberculosis? . . 66
XXI. How Can Proper School Hygiène Become a Factor in the Prevention of Tuberculosis? 68

CHAPTER PAGE

XXII. Can Tuberculosis Be Cured? 75

XXIII. Have the Former Patients Who Left Sanatoria or Special Institutions for the Treatment of Consumption as Cured, Remained Lastingly So? 77

XXIV. What Are the Modern Methods to Treat and Cure Consumption? 78

XXV. What is a Modern Sanatorium for Consumptives? And Can Such a Sanatorium Become a Danger to the Neighborhood? 79

XXVI. What Are the Duties of Modern Municipal Authorities in the Prevention of Tuberculosis? 86

XXVII. What Should School Authorities Do with the Child Predisposed to Scrofulosis or Tuberculosis and the One Which Has Already Contracted the Disease? 87

XXVIII. Can the Treatment of Consumption be Carried Out with Satisfactory Results at the Home of the Patient? 89

XXIX. What Are Public, State, Municipal, or Private Sanatoria? 102

XXX. What Evidence Exists that by Taking Care of Consumptives in Special Institutions and by Hygienic Measures, Tuberculosis as a Disease of the Masses Can Really be Successfully Combated? 105

XXXI. What Can Philanthropists and Other Men and Women of Good Will Do to Help Combat Tuberculosis as a Disease of the Masses? 106

XXXII. How Might the Tuberculosis Problem in the United States be Solved by Judicious Legislation and a Combination of Public and Private Philanthropy? 110

XXXIII. What Has Already Been Accomplished by United Efforts to Combat Tuberculosis as a Disease of the Masses in the United States? (An Historical Review.) . . . 117

XXXIV. Conclusions 121

LIST OF ILLUSTRATIONS

FIG.		PAGE
1.	Robert Koch (Dec. 11, 1843–May 27, 1910). Discoverer of the Tubercle Bacillus	12
2.	Tubercle Bacilli in Expectorated Matter; 1,200 Times Enlarged	19
3.	Knopf's Elevated Spittoon-Stand of Wood	22
4.	Knopf's Ornamental Elevated Spittoon	22
5.	Knopf's Elevated Self-cleaning Street or Garden Spittoon	23
6.	Knopf's Thibert Self-flushing Elevated Cuspidor with Cover	23
7.	Metal Floor Cuspidor with Large Opening. Should be Partly Filled with wet Saw-dust. Cover Worked by the Foot	24
8.	The Same when Closed	24
9.	Predohl's Enamelled Spittoon	24
10.	Sanitary Elevated Cuspidor of Gold-bronzed Metal. When in Use	25
11.	Sanitary Elevated Cuspidor when Closed	25
12.	Dettweiler's Pocket Flask	26
13.	Knopf's Nickel-plated, Oval-shaped Pocket Flask, Manageable with One Hand	26
14.	Knopf's Nickel-plated, Oval-shaped Pocket Flask, Hidden in the Folds of a Handkerchief	27
15.	Method of Emptying the Flask	27
16.	Liebe's Pocket Spittoon	28
17.	Knopf's Nickel-plated Flask with Plain Cover, also made of Aluminum	28
18.	Pocket Sputum Case of Paper	28
19.	Pasteboard Sputum Purse	29
20.	Johnson & Johnson's Pasteboard Purse	29
21.	Spit-cup of Aluminum or Porcelain	30
22.	Frame of Seabury & Johnson's Spitting-cup	30
23.	Folded Cardboard to Seabury & Johnson's Spitting-cup; to be Burned after Use	30
24.	Kny-Scheerer's Sanitary Sputum Cup of Pressed Paper	31
25.	Normal Chest; Vital Organs in Right Position	42
26.	Too Tightly-laced Chest; Vital Organs Displaced	42
27.	Result of Tight Lacing in the Bony Frame of the Chest	42
28.	Suspender Vest	43
29.	A Lesson in Ventilation	46
30.	Humidifier	47
31.	Hair Hygrometer	48
32.	First and Second Breathing Exercises	49
33.	Third Breathing Exercise	50
34.	Fourth Breathing Exercise	50
35.	Breathing Exercise with Rolling of Shoulders	51
36.	Exercise for People in the Habit of Stooping	51
37.	Patients at the Riverside Hospital-Sanatorium on North Brother Island, taking Respiratory Exercises under their Physicians' Directions	53

FIG. PAGE
38. Open Air—Open Minds 55
39. A School-room where the Ventilation Affords no Difficulties. (From "Open-Air Crusaders," by Sherman C. Kingsley.) . . . 55
40. Children Afflicted with Tuberculous Bone or Joint Diseases, at Play in Midwinter at the Sea Breeze Sanatorium, Coney Island, N. Y. 76
41. Outdoor Sleeping in Midwinter on the Veranda of the Infirmary of the Adirondack Cottage Sanatorium, at Trudeau, N. Y. . . . 81
42. Rest-cure in Midwinter at the Massachusetts State Sanatorium, Located at Rutland, Mass. 82
43. Patients at the Loomis Sanatorium Exercising just Sufficiently to Help Along the Cure 83
44. Rest-cure in the Woods. At the Reiboldsgrun Sanatorium (Germany). 85
45. By Removing a Part of the Brick Wall an Old Discarded Schoolhouse has been Made an Ideal Open-air School. The First Established in the United States. 88
46. Open-air School on the *Southfield*, a Discarded Ferryboat Anchored at Foot of East 26th Street, New York City 89
47. A Cheap Temporary Porch, Protected by an Awning and Supported by Braces set at an Angle. It can be Built for $12 or $15. (From Carrington's "Direction for Sleeping in the Open Air.") . . 90
48. A Somewhat more Elaborate Porch for Sleeping and Living Out of Doors, which can be Easily Attached to the Rear of any House 91
49. Starnook (Knopf Model) for the Rest-cure in the Open Air and for Outdoor Sleeping at Night 92
50. Interior of Starnook (Knopf Model) with Windows, Roof, and Shutters Closed. View from Ajoining Bathroom 93
51. Starnook (Knopf Model) Transformed from Night Shelter to a Pleasant Resting Porch by Day 94
52. Interior of Starnook (Knopf Model), with Windows, Roof, and Shutters Open. View from Adjoining Bathroom. 95
53 and 53A. Diagram Showing the Mechanism of the Movable Iron Slats 96
54. Beach Chair Arranged for the Open-air Rest-cure 97
55. Dr. S. A. Knopf's Transportable Half-tent for the Rest-cure in the Open Air 98
56. Dr. S. A. Knopf's Window-tent in Position, with Patient in Bed Looking Through the Celluloid Window into the Room, but Breathing Outdoor Air Only 99
57. Diagram Showing Ventilation of Window-tent 100
58. View of the Window-tent as Seen from the House Opposite . . 100
59. Dr. S. A. Knopf's Window-tent Raised when not in Use . . 101
60. Woollen Hood or Helmet for Outdoor Sleeping in Cold Weather . 102
61. Panorama of Part of the Adirondack Cottage Sanatorium . . 103
62. Model of Massachusetts State Sanatorium 104
63. The First Preventorium for Adults, Brehmer Rest, Ste. Agathe des Monts 113
64. The First Preventorium for Children at Farmingdale, N. J. . . 114

TUBERCULOSIS

AS A DISEASE OF THE MASSES AND HOW TO COMBAT IT

CHAPTER I

What is Consumption?

Pulmonary consumption, or tuberculosis of the lungs, is a chronic disease caused by the presence of the tubercle bacillus, or germ of consumption, in the lungs. The disease is locally characterized by countless tubercles, that is to say, small rounded bodies, visible to the naked eye. The bacilli can be found by the million in the affected organ. It is this little parasite, fungus, or mushroom belonging to the lowest scale of vegetable life, which must be considered as the specific cause of all tuberculous diseases. This parasite not only gradually destroys the lung substance through ulcerative processes, but gives off at the same time certain poisonous substances called toxins which give rise to various, and often serious, symptoms.

Fig. 2.—Tubercle Bacilli in Expectorated Matter; 1,200 times enlarged.

Symptoms of Tuberculosis of the Lungs.

The important earlier symptoms of pulmonary tuberculosis are long-continued cough or hoarseness; loss of flesh; flushes or pallor in the face; feverish sensation in the afternoon; occasional night-sweats; chilly sensations in the morning; loss of appetite; sometimes a little streak of blood in the expectoration; loss of strength manifesting itself in getting tired easily; frequent colds; a perceptible quickening of the heart-

beats after slight exertion; a little change in disposition, at times an increased irritability or a feeling of depression; a disinclination to pursue certain work which the individual formerly loved to do, or even a disinclination to pleasures which were formerly enjoyed by him.

In the matter expectorated, it is often possible to find the tubercle bacillus with the aid of the microscope and certain coloring matters. It appears in the form of small, slender rods. To give an idea of the minute size of these bacilli or bacteria, we reproduce here what is called a microscopic field twelve hundred times enlarged; in other words, just what one sees after having prepared a small portion of expectorated tuberculous matter under the microscope. The rods represent the bacilli; the round or irregular bodies represent other substances, mucus or pus, which have been ejected along with the bacilli (Fig. 2).

CHAPTER II

How may the Germ of Consumption (Bacillus Tuberculosis) Enter the Human System?

1. By being inhaled; that is, breathed into the lungs.
2. By being ingested; that is, eaten with tuberculous food. (Meat or milk derived from tuberculous animals or anything edible with which tuberculous matter has come in contact.)
3. By inoculation: that is, the penetration of tuberculous substance through a wound in the skin.

Of these three ways in which the bacilli may enter the human system, the first one seems to be the most frequent.

CHAPTER III

How does the Inhalation of the Bacilli Take Place?

A consumptive individual, even at a period when he is not confined to his bed, may expectorate enormous quantities of bacilli. Now if this expectoration, or spittle, is carelessly deposited here and there, so that it has an opportunity to dry and become pulverized, the least draught or motion in the air may cause it to mingle with the dust, and the individual breathing this dust-laden atmosphere is certainly exposed

to the danger of becoming tuberculous, if his system offers a favorable soil for the growth of the bacilli. By "favorable soil for the growth of the bacilli" must be understood any condition in which the body is temporarily or permanently enfeebled. Such a condition may be inherited from parents, or acquired through alcoholism or drunkenness, through other intemperate habits, privation or disease, and sometimes through predisposing occupations.

Droplet Infection.

Besides the danger arising from carelessly deposited sputum, or spittle, the inhalation or ingestion of the small particles of saliva which may be expelled by the consumptive during his so-called dry cough, or when he speaks quickly or loudly, or sneezes, must also be considered dangerous for those who come constantly or frequently in close contact with the invalid. These almost invisible drops of saliva may contain tubercle bacilli. Experiments in this direction have shown the possibility of infection by this means.

CHAPTER IV

What must be Done to Check the Spread of Consumption Caused by the Expectoration of Pulmonary Invalids?

Consumptives and those living with them must know that all precautionary measures are instituted in the interest of the invalid as well as of his fellow-men. These measures protect the patient from reinfection and others from the danger of contracting the disease.

Infection and Reinfection.

A patient suffering from pulmonary consumption should know that, no matter in what stage of the disease he may be, his expectoration or spittle may spread the germ of the disease if the matter expectorated is not destroyed before it has a chance to dry and become pulverized. The patient should, therefore, always spit in some receptacle intended for the purpose. It is best to have this vessel made of metal. It should be half filled with water or some disinfecting fluid, the main thing being to make it impossible for the expectoration to dry.

In factories, stores, railroad cars, waiting-rooms, court-rooms, restaurants, saloons, meeting-places, theatres, menageries—in short, wherever many people congregate—there should be a sufficient number of cuspidors well kept and

regularly cleaned. They should be made of unbreakable material and have wide openings. If such measures are carried out, there will be no excuse for any one to expectorate on the floor and thus endanger the lives of his fellow-men.

Stationary Spittoons.

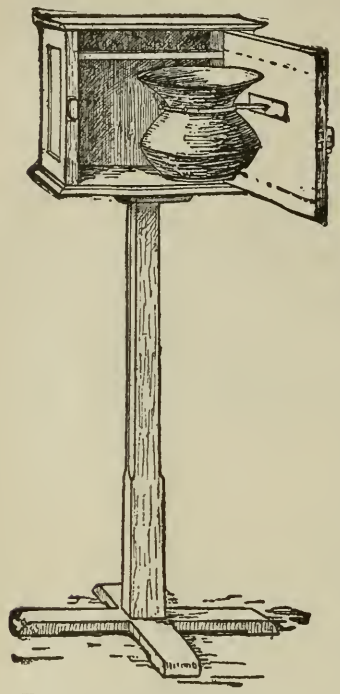

Fig. 3.—Knopf's Elevated Spittoon-Stand of Wood.

In the sick-room of a private home, at hospitals or sanatoria, in fact wherever possible, covered cuspidors should be used, and it is better to have them placed on stands, in niches, or in elevated boxes. We give two examples of the last-named kind in Figs. 3 and 4, showing a blue enamelled iron spittoon in a box elevated on a stand. The spittoon is fastened by a clamp to the door of the box, and can be easily removed for cleaning. The stand is most convenient when about three feet in height. Such an arrangement, besides making it certain that all the sputum will reach the inside of the spittoon, has the additional pleasant feature of making the cuspidor visible only while it is being used by the patient. The cover of the receptacle prevents flies and other insects from coming in contact with the sputum. It has been proved that insects, especially flies, often carry the bacillus out of the sick-rooms of consumptives when sufficient care is not taken to cover the expectoration. The fly which has come in contact with tuberculous matter may spread the disease in three ways. First, it may carry small particles of spittle on its feet and leave them wherever it may alight. Secondly, if it has partaken of tuberculous matter, it deposits its excrement at the next opportunity on some article of food,

Flies as Carriers of Tuberculosis Germs.

Fig. 4.—Knopf's Ornamental Elevated Spitton.

and thus the bacilli find their way into the digestive organs of man or beast. Thirdly, these insects, when dead, dry and crumble to dust which contains the bacilli, and the germs of the disease may thus enter the lungs.

Fig. 5. — Knopf's Elevated Self-cleaning Street or Garden Spittoon.

Elevated Self-Cleansing Spittoon.

The cuspidor of metal elevated and covered, presents further advantages over the usual uncovered vessel of porcelain or earthenware. Animals, such as dogs, cats, etc., will not be able to reach the contents of the cuspidor; and there is less danger of its bursting when placed outdoors at freezing temperature if enclosed in a box. Here are also shown two elevated self-cleansing spittoons which seem to me particularly suitable for railway stations, public buildings, play grounds and gardens, and even in the streets, especially of health resorts much frequented by consumptives (Figs. 5 and 6).

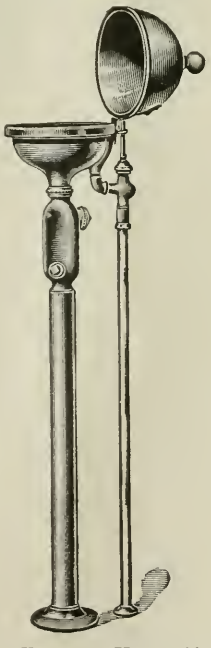

Fig. 6.—Knopf's Thibert Self-flushing Elevated Cuspidor with Cover.

If the use of elevated spittoons is not feasible, I would suggest a cuspidor such as is illustrated in Figs. 7 and 8. Such a device can be manipulated by the foot and can be kept in good and safe condition by being partially filled with wet sawdust so as to prevent the sputum from spattering. The sawdust should, of course, be burned every time the receptacle is emptied.

For factories, workshops, etc., Predohl's enamelled iron spittoon, nine inches high, eight inches in its largest and three inches in its smallest diameter, seems to answer all practical purposes. As the accompanying drawing (Fig. 9) indicates, it can be suspended at any height, and is very easily cleaned and disinfected. For offices

and stores a somewhat more elegant device, such as illustrated in Figs. 10 and 11, may be installed.

When outdoors, the patient should use a pocket flask to receive the spittle. There are numerous flasks in the market, and I give here illustrations of a few of them: Dettweiler's, of blue glass and in three pieces (Fig. 12); Knopf's, of nickel-plated metal (Figs. 13, 14 and 15); Liebe's, of blue glass in two pieces (Fig. 16); and Knopf's unbreakable aluminum or nickel-plated flask, also in two pieces (Fig. 17). The directions for use usually accompany each flask. The more expensive ones (Figs. 12, 13 and 16) can be manipulated with one hand. The cleaning of all of them is easy. The expectoration received in any receptacle, large spittoons or pocket flasks, should be so disposed of that the bacilli are killed. Where there is a good sewerage system the contents of these cuspidors may, without danger, be poured into the water-closet. Where there is no running water and perfect sewerage, it is better to boil the contents of the spittoons before pouring them into the water-closet. Thus, whenever possible, the tuberculous expectoration, that is to say, the entire contents of all classes of cuspidors, should be placed in a pot kept for that purpose which is partially filled with water. Every twenty-four hours or so this pot should be put on the fire and the contents brought to a boil. To raise the boiling point it might be well to add to each quart of water one or two teaspoonfuls of washing soda. After the mixture has boiled for about five minutes, it can be considered totally harmless, for all the bacilli will have been killed. The disinfection of tuberculous expectoration by carbolic acid (5 per cent) or mercurial solutions (1 : 2,000) is not so certain, since these substances cause the

Pocket Spittoons.

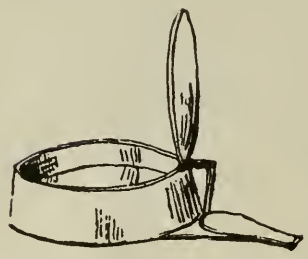

Fig. 7.—Metal Floor Cuspidor with Large Opening. Should be partly filled with wet saw-dust. Cover worked by the foot.

Fig. 8.—The Same When Closed.

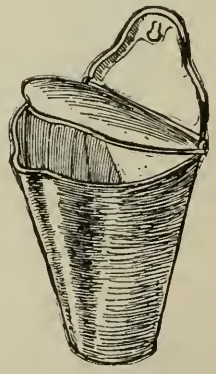

Fig. 9.—Predohl's Enamelled Spittoon.

albumen in the expectoration to coagulate, and thus form, in a measure, a protective cover for the bacilli making their total destruction more difficult. Ordinary commercial wood vinegar is a better and more convenient disinfectant and need not be diluted when used.

Disinfection and Destruction of Tuberculous Matter.

When people are so situated as not to be able to dispose of the contents of the pocket spittoons by boiling or disinfection, we would recommend the following method: pour the contents of the flask on several layers of newspaper, gathering up the edges and being careful not to spill any, then throw the whole at once into the fire.

Fig. 10.—Sanitary Elevated Cuspidor of Gold-bronzed Metal. When in Use.

Some patients may prefer to use paper sputum receptacles resembling cigar cases or purses. Such, of course, must be burned with their contents as soon as possible, and always before the contents have had a chance to dry. (Figs. 18, 19, 20.)

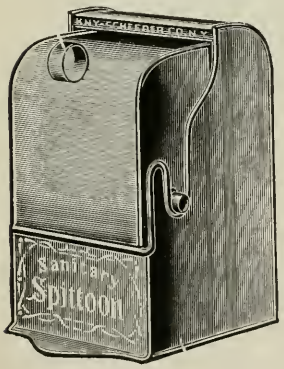

Fig. 11.—Sanitary Elevated Cuspidor When Closed.

There will always be some consumptives who cannot be persuaded to use the pocket flask, for the simple reason that they do not wish to draw attention to their malady. The only thing for these people to do is to use squares of soft muslin, cheese-cloth, cheap handkerchiefs, or Japanese paper handkerchiefs specially manufactured for that purpose, which can be burned after use. They should also place in their pockets a removable lining of rubber or other impermeable substance which can be thoroughly

cleaned. This additional pocket could be fastened to the inside of the ordinary pocket by clamps, and would thus be of no inconvenience to the patient. A rubber pouch or an Oriental tobacco-pouch may be used in place of the extra pocket of impermeable material. In any case it is well to have more than one of these pockets or pouches, so that the patient is never without one while they are being cleaned and immersed in some disinfectant solution or boiling water. Of course, all invalids using ordinary handkerchiefs, rags, or Japanese paper handkerchiefs as receptacles for expectoration, are in danger of soiling their hands with infectious matter and should always wash them thoroughly before touching food.

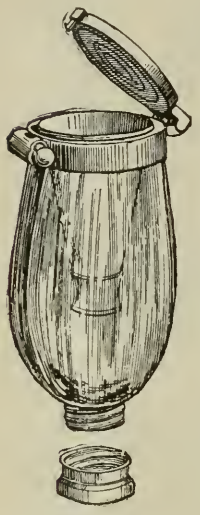

Fig. 12.—Dettweiler's Pocket Flask.

A handkerchief that is used to wipe the nose should never be used as a receptacle for sputum. Bed-patients too sick to make use of light porcelain or aluminum cups (Fig. 21), or pasteboard cups such as Seabury & Johnson's (Figs. 22, 23), or the Kny-Scheerer pressed-paper cup (Fig. 24), should have a number of moist rags within easy reach. Care should be taken that the rags always remain moist, and that the used ones are burned before they have a chance to dry. The paper spit-cups with their contents should, of course, also be destroyed by fire.

Spittoons at Bedside.

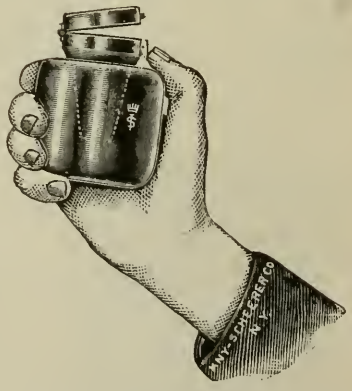

Fig. 13.—Knopf's Nickel-plated Oval-shaped Pocket Flask, manageable with one hand.

If the tuberculous patient should be outdoors and accidentally not have with him a receptacle of any kind, he may expectorate in the gutter where running water may carry the spittle into the sewer, or he may even as an exception be permitted to expectorate in the middle of the street. Under no condition should he, or for that matter anybody else, expectorate on the sidewalk, for it must be remembered that we can carry the most infectious germs into our homes on the

soles of our shoes. Trailing dresses may likewise aid in carrying the germs into our homes.

While the patient should make it a practice to train himself not to cough uselessly, thereby irritating his throat and making an unpleasant noise, if he feels that he must expectorate he has a right and a duty to cough, of course holding a handkerchief before his mouth while doing so. He should not suppress the cough with expectoration, nor should he out of false modesty swallow his expectoration. There is danger of the intestines becoming infected in this way. **Coughing.**

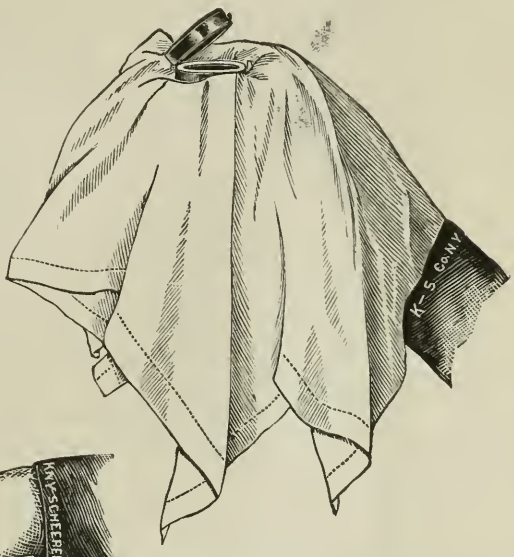

Fig. 14.—Knopf's Nickel-plated Oval-shaped Pocket Flask, hidden in the folds of a handkerchief.

Before speaking of the disinfection of the sickroom, I wish to call attention once more to the danger of the housefly as a carrier of the tuberculosis germs and the germs of other diseases. Not only should all receptacles which receive tuberculous sputum be covered, but it is well, by careful screening, to prevent flies from entering sickrooms. We should endeavor as far as possible to get rid of these insects. The following instructions, issued by the Health Department of New York, may be helpful in their extermination: **Destruction of Flies in Sickrooms.**

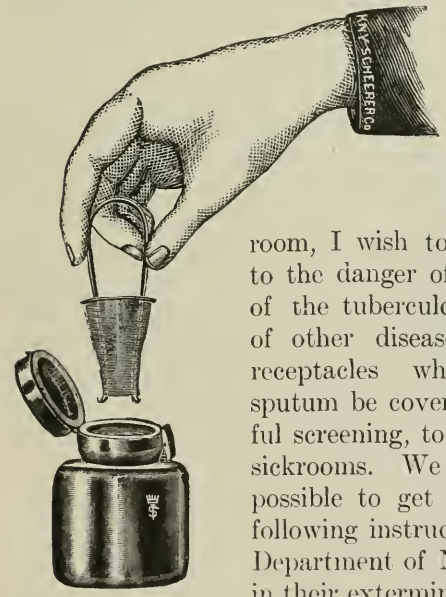

Fig. 15.—Method of Emptying the Flask.

"Keep the flies away from the sick, especially those ill with contagious diseases. Kill every fly that strays into the sickroom. His body is covered with disease germs.

"Do not allow decaying material of any sort to accumulate on or near your premises.

"All refuse which tends in any way to fermentation, such as bedding, straw, paper waste, and vegetable matter, should be disposed of or covered with lime or kerosene oil.

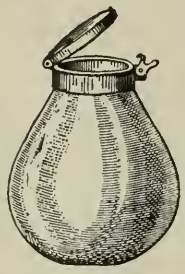

Fig. 16. — Liebe's Pocket Spittoon.

"Keep all receptacles for garbage carefully covered and the cans cleaned or sprinkled with lime or oil.

"Keep all stable manure in vault or pit screened or sprinkled with lime or kerosene or other cheap preparation.

"See that your sewerage system is in good order, that it does not leak, and is up to date and not exposed to flies.

"Pour kerosene into the drains.

"Cover food after a meal; burn or bury table refuse.

"Screen all food exposed for sale.

"Screen all windows and doors, especially the kitchen and dining-room.

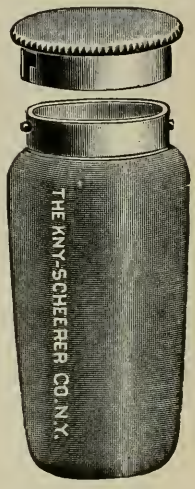

Fig. 17.—Knopf's Nickel-plated Flask with Plain Cover, also made of Aluminum.

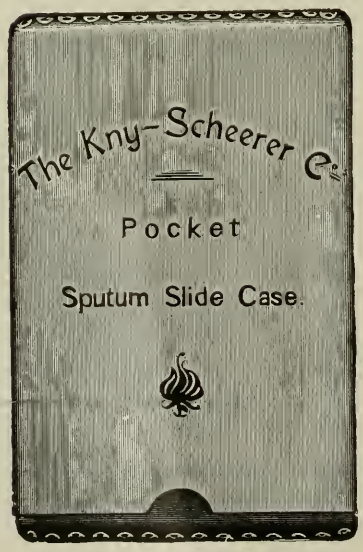

Fig. 18.—Pocket Sputum Case of Paper.

"Burn pyrethrum powder in the house to kill the flies.

"Don't forget that if you see flies, their breeding place is near-by filth. It may be behind the door, under the table, or in the cuspidor. If there is no dirt or filth there will be no flies."

To get rid of the fly in the sick-room, if it has escaped the attempts of extermination outside of it, I would suggest to place in a number of plates, distributed about the room, a weak solution of formaldehyde in water (two teaspoonfuls to

the pint) to which should be added a little sugar. Flies are attracted to this mixture which they drink; some die in the water, others will fall dead near by.

The rooms occupied by a tuberculous patient should be thoroughly disinfected at regular intervals, since it is possible that even with great care the furniture, floors, walls, etc., may have been infected. Even the occasional disinfection of the personal effects of the patient is advisable. In case of decease it is, of course, self-understood that everything the consumptive might have come in contact with, particularly furniture, bedding, clothing, books,* etc., should be thoroughly disinfected. In many communities such disinfection is now attended to by the board of health. Where the aid of the health board cannot be secured, the following directions will enable one to make a thorough disinfection by formaldehyde gas: 1. All cracks or openings in the plaster, in the floor, or about the doors and windows should be caulked tight with cotton or strips of cloth. 2. The linen, quilts, blankets, carpets, etc., should be stretched out on a line in order to expose as much surface as possible to the disinfectant. They should not be thrown into a heap. Books should be suspended by their covers, so that the pages will fall open and be freely exposed. 3. The walls and the floor of the room and the articles contained in it should be thoroughly sprayed with water. If masses of matter or sputum are dried on the floor, they should be soaked with water and loosened. No vessel of water should, however, be allowed to remain in the room. 4. One hundred and fifty cubic centimetres (five ounces) of the commercial forty-per-cent. solution

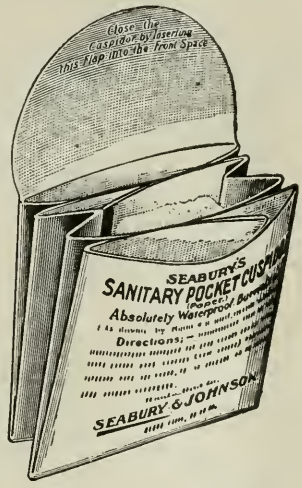

Fig. 19.—Pasteboard Sputum Purse.

Fig. 20.—Johnson & Johnson's Pasteboard Purse.

Formaldehyde Disinfection of Rooms, etc.

*The possibility of transmitting tuberculosis through books has been demonstrated, particularly if the patient has been in the habit of moistening his fingers with saliva while turning the leaves.

of formalin for each one thousand cubic feet of space should be placed in the distilling apparatus and be distilled as rapidly as possible. The keyhole and spaces about the door should then be packed with cotton or cloth. 5. The room thus treated should remain closed at least ten hours. If there is much leakage of gas into the surrounding rooms, a second or third distillation of formaldehyde should be made at intervals of two or three hours.

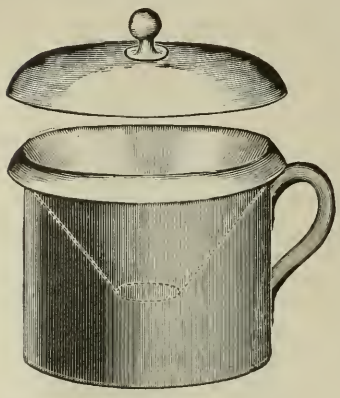

Fig. 21.—Spit-cup of Aluminum or Porcelain.

To be sure that the work is well done, it is always best to have it supervised by a physician or an experienced disinfector. To managers of hotels and boarding-houses in health resorts and to sleeping-car companies, this method of disinfection is particularly to be recommended. The disinfection of rooms should always take place immediately after the patient has left. In some cities and villages tuberculosis seems to cling to certain localities and houses. The disease appears in a veritable endemic form, that is to say, it is always present there, either from the fact that careless tuberculous patients have lived for years in these houses, or owing to the equally important fact that the soil on which they are built, or the manner in which they have been constructed, is such as to favor the retention of the tuberculous infection indefinitely. When a thorough sanitary overhauling does not suffice to stamp out these sources of infection, the destruction of such dwellings seems the only remedy.

Permanently Infected Houses.

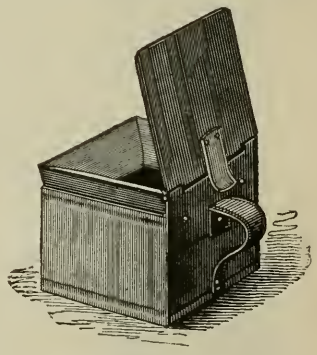

Fig. 22.—Frame of Seabury & Johnson's Spitting-Cup.

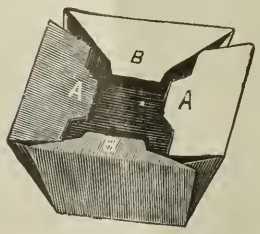

Fig. 23.—Folded Cardboard to Seabury & Johnson Spitting-cup. To be burned after use.

When a community is not provided with a perfect sewerage system, it is better that the stools, etc., of patients

suffering from tuberculosis of the intestines, urine, or pus from wounds should be disinfected by a five-per-cent. solution of carbolic acid. The superficial burying of tuberculous meat or tuberculous expectorations without previous thorough disinfection must be considered as dangerous.

Danger of Superficial Burial of Tuberculous Substances.

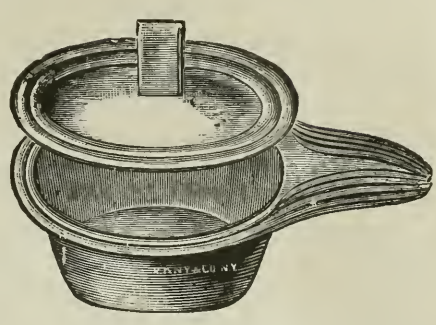

Fig. 24.—Kny-Scheerer's Sanitary Sputum Cup of Pressed Paper.

Now, although it is true that the sun and the air ultimately make the germs of tuberculosis harmless, it is not wise to rely upon this. Human beings may come in contact with tuberculous substances or the latter may be licked up by animals before the sun and air have had time to kill the bacilli, and in dark and damp places it often takes a long time before atmospheric influence renders the tuberculous matter absolutely inoffensive.

CHAPTER V

What can be Done as a Protection Against Droplet Infection?

In the small particles of saliva which are expelled during the so-called dry cough, or in cough prior to expectoration, there may be tuberculosis germs, and infection from them is possible.

There is, however, real danger from this source of infection only when one remains a considerable length of time very near the tuberculous patient while he coughs, speaks, or sneezes. At a distance of three or four feet the danger practically ceases. The relatively few bacilli which are expelled with the saliva during the dry cough, sneezing, or loud speaking, are probably never thrown farther than three feet, and fall rapidly to the ground.

But even the lesser danger which may arise from the bacilli having fallen to the floor with the particles of saliva must be prevented. They must not be allowed to accumulate and so be blown up with the dust into the air.

Friends, relatives, and nurses should not remain very near

the patient longer than necessary, and the tuberculous invalid should be urged always to hold a handkerchief before his mouth and nose while coughing or sneezing. He should, furthermore, be advised always to carry two handkerchiefs with him: one to hold before his mouth and to wipe it with after having expectorated; the other to use only to wipe his nose. By being careful with the use of his handkerchiefs, the danger of infecting his nose and bronchial tubes will be materially lessened. Should the patient ever be for a moment without a handkerchief he should at least hold his hand before his mouth when coughing, to avoid this droplet infection.

Precautions to be taken by the Patient.

All soiled linen (sheets, pillow-cases, underwear, napkins, handkerchiefs, etc.) used by the consumptive, should not be handled more than necessary, but should be placed in water as soon as possible after removal from bed or body. It is better to wash these articles separately, and only after having been thoroughly boiled should they be put with the common laundry. Wherever it is not possible to carry out these precautionary measures in their entirety, one should strive to follow them as far as it is in one's power.

Precautions with the Washing.

It is necessary to remember that when table utensils, such as drinking cups and glasses, forks, spoons, etc., which come in direct contact with the mouth, have been used by a consumptive, they should never be used by any other person before they have been thoroughly washed with soap and hot water, or placed in boiling water for a few moments. No one else, of course, should use the patient's napkin. If he cannot have a clean one at every meal, it is well to keep it in some sort of an impermeable case, or even a cover of washable material, so that it need not be handled unnecessarily.

The physician will have taught the patient to cough only when he feels that he must expectorate, and if he practises the other precautions already mentioned, a tuberculous invalid can be a very agreeable companion at the table. To ask an honest, conscientious, and well-trained consumptive to take his meals separately is as unkind and unnecessary as can possibly be, and certainly, if insisted upon, it is enough to make the patient thoroughly unhappy. It should be the privilege of those living with the tuberculous invalid to make him as happy, as cheerful, and as hopeful as possible. Happy surroundings, a cheerful face, a hopeful word from those about him will be no small factor in accomplishing his cure.

Control of Cough.

Kindness to Consumptives.

CHAPTER VI

What Should the Home Hygiene Be in the Rooms of the Tuberculous, or in any Home, in Order that Tuberculosis may not Develop or Spread?

In the rooms of a tuberculous patient it is preferable never to have a fixed carpet on the floor, though small rugs, which can easily be cleaned, may be permitted so that the room will not be cheerless. The wooden floor should never be swept with a broom, but the dust should frequently be wiped up with a wet cloth or with crude oil. If there is a fixed carpet, let the sweeping be preceded by throwing moist sawdust or moistened bits of paper on the floor to allay the dust. It is well, also, while sweeping, to lower the windows from the top and keep them closed at the bottom. The woodwork and furniture should be wiped with a moist or slightly oily cloth, according to the nature of the surface. Whenever possible, the cleaning should be done by the pneumatic exhaustive or vacuum process. This is the ideal method of cleaning the apartment of the sick. There are portable devices now in the market which can be procured at reasonable rates, and thus the poor consumptive may be able to avail himself of this hygienic mode of removing dust.

Arrangement of the Consumptive's Room.

Plush, velvet, or cloth-covered furniture, heavy curtains or other fancy decorations which might serve as dust-catchers, should not be allowed in the room. Leather-covered, rattan, and plain wooden furniture is certainly the best, and the curtains should always be of washable material. Fancy curtains of cloth, velour, or silk, which accumulate dust and keep the air and sun out of the rooms, should be discarded. Telephones and door-knobs, much used by the consumptive, should be cleaned daily.

If at all possible, every patient should have his own room, but he should always have his own bed. For a well person to sleep in a bed very close to a tuberculous patient is almost as dangerous as to sleep in the same bed.

Tuberculosis may justly be called a dust and indoor disease. The less dust the less tuberculosis. The less people live in an indoor atmosphere, the less are they liable to contract this disease. The feather-duster should never be used as an instrument for cleaning; it never cleans, it only removes the dust from one place and causes it to settle somewhere else.

CHAPTER VII

How can We Guard Against Germs of Tuberculosis in Our Food?

Although the question whether or not tuberculosis is as frequently transmitted from animals to man, particularly from cattle, as was formerly thought, is still under consideration by scientists, the possibility of transmission of bovine tuberculosis (tuberculosis from cattle to man) has been demonstrated beyond doubt. According to most careful work done in the research laboratory of the New York Health Department, under the direction of Prof. William H. Park, nine to ten per cent of all fatal cases of tuberculosis, particularly in children, are due to the bovine bacillus, which is quite distinct from the human type. Therefore, whenever one is not reasonably certain that the meat one eats has been carefully inspected and declared free from disease germs, it should be very thoroughly cooked. By this means one is certain to kill all the dangerous micro-organisms. Against the sale of tuberculous milk there are very excellent laws in certain States and cities of the Union, which are rigorously enforced. In some States, however, the laws are less good, and in others there are no laws at all at the present time. In New York City all raw milk sold for drinking purposes must come from tuberculin-tested cattle and a careful watch is kept over the supply at both the country and city ends of the line.

Municipal Supervision of Milk Supply.

The classification of salable milk devised by the New York City Health Department is well worthy of emulation.

Grade A milk is intended especially for the feeding of infants, and is certified, guaranteed, or pasteurized according to special regulations of the department. Grade B milk, for ordinary drinking purposes, is that of known origin, though not of the highest percentage of fat, and milk pasteurized according to the ordinary regulations of the department. Grade A milk is sold only in bottles; Grade B milk is sold either in bottles or in containers, but is not dipped. No milk inferior to these grades is sold for drinking purposes. Grade C milk is known as "cooking milk," and comprises all other milk complying with the departmental regulations. It is sold from cans or in bottles.

In justice to farmers and dairymen it must be said that there are many who do their very best to protect themselves and

their fellow-men from the danger of becoming infected with tuberculosis. They have their cows tested regularly, destroy the animals which are found to be tuberculous, and keep their stables and utensils clean.

It is, of course, well known that for babies the breast milk of the healthy mother is the only proper food. To be nursed, even if only for two or three months, is of life-long benefit to the baby; mixed nursing (half nursing and half feeding) is better than no nursing at all. That great American physician, and the best friend babies ever had, Professor Jacobi, once wrote to the author on this subject: "Willing mothers will not look for a pretext for weaning." Next best to mothers' milk is cow's milk, modified to suit the age of the child. If there is any doubt as to the purity of cow's milk it should be pasteurized (heated to 165° F., and kept at that temperature for thirty minutes). Dr. Jacobi recommends as equally efficacious the following procedure: Heat the milk to near boiling point, that is to say, until the appearance of the first bubbles; remove it from the fire, let it cool some, then expose it to a cold temperature.

Boiling or Sterilizing Milk.

There are now in the market a number of cheap and practical apparatuses for sterilizing milk, which can be obtained in almost any drugstore; but I would not advise mothers to pasteurize, boil, or modify the milk, or use any apparatus without special advice from their physician.

CHAPTER VIII

In What Other Ways may the Bacilli or Germs of Consumption Enter the Intestinal Tract?

Since the tubercle bacillus may be found in the saliva of a tuberculous patient, it is best never to kiss such a person on the mouth. The habit of caressing or kissing domestic animals (parrots, canary-birds, dogs, cats), many of whom are tuberculous, is equally dangerous, for through such habits these animals can certainly transmit tuberculosis to man.

Infection from Baccilliferous Saliva or Sputum.

As has been said before, the patient should never swallow his expectoration. He will thus avoid the danger of contracting intestinal tuberculosis. How important this warning is may become evident from observations of the tuberculous insane. These unfortunate people, with whom hygienic education is

impossible, often swallow their expectoration, and as a consequence intestinal tuberculosis or consumption of the bowels is very frequent among them. I repeat that every consumptive patient should remember never to touch food before having washed his hands very thoroughly. Even with the greatest care, it is possible that he may have soiled his hands with tuberculous expectoration.

The public drinking cup, wherever it may be used, in schools, parks, playgrounds, offices, or railway cars, often serves to transmit contagious diseases and should be replaced by the sanitary fountain or by paper cups. Protestant ministers should only use individual cups in their communion services, and in Catholic churches instead of kissing crosses, relics, and other articles of veneration, the devotee might touch those objects with the forehead. The cleaning and disinfection of all articles of veneration with some antiseptic fluid should nevertheless be performed frequently.

Communion Cup and Articles of Veneration.

In the chapter relating to protection of infants and children at home, in kindergartens and schools, we will enumerate the multiple sources of direct infection through the intestinal tract. It may suffice here to state that any object which may have come in contact with the saliva of a tuberculous patient may cause the infection of the healthy individual, child or adult, if he happens to be predisposed to tuberculosis.

Men afflicted with tuberculosis would better not wear any beard or long mustache, in which particles of infectious sputum may be retained. If they do not wish to dispense with these ornaments, let them at least clip beard and mustache close enough to minimize the danger of infection, and be very particular about washing them. There can never be any excuse for not doing what one can toward the prevention and cure of disease with its concomitant suffering, misery, and unhappiness in general.

CHAPTER IX

How may Tuberculosis be Contracted through Inoculation (Penetration of Tuberculous Substances through the Skin)?

Inoculation of tuberculosis happens perhaps most frequently through injuries received while cleaning nicked or chipped glass or porcelain cuspidors which had been used by consump-

tives. It is also possible for the bacilli to enter the circulation if the person cleaning the spittoons happens to have a wound or open sore on his hand. Persons entrusted with the care of the spittoons in a private home or an institution for consumptives should wear rubber gloves while cleaning these vessels.

Care to be Taken in Cleaning Spittoons.

At times the patient may inoculate himself by placing an accidentally injured finger in his mouth, or by carelessly soiling an open wound with his expectoration.

Physicians, students of medicine or veterinary science, etc., are also exposed to the danger of wounding themselves with instruments which may have come in contact with tuberculous matter. Extreme care is the only remedy for all persons thus exposed.

If one has been unfortunate enough to receive an injury and tuberculous inoculation is feared, the best thing to do is to let the wound bleed freely, wash it thoroughly with water that has been boiled, with a five-per-cent solution of carbolic acid, or with pure alcohol; dress the wound with a clean rag dipped in any of these liquids, and seek as soon as possible the advice of the physician.

Tattooing.

Tuberculosis has been transmitted in various instances by tattooing, because the operator was a consumptive. Men who follow the profession of tattooing have, as a rule, the habit of dissolving the colors, necessary for their work, with their own saliva, hence the infection. The best thing, therefore, is never to permit such barbaric decorations on one's body.

Of less frequent causes of propagation of tuberculosis, which, in the light of modern sanitary science can and should be prevented, we will cite the ritual act of circumcision, practised according to Jewish rites, when the operator happens to be consumptive. It is also well known that, through lack of skill in after-treatment, secondary hemorrhage and wound infection have ensued. Too many a young life has thus been needlessly sacrificed. The operation of circumcision, when skilfully and rapidly performed, is in itself trifling, but the sucking of the prepuce afterward makes it dangerous. Since it will be difficult to stop this practice by a simple protest on the part of physicians, and as the law cannot interfere with the free exercise of a religious rite, I would suggest as a remedy that only such persons should be allowed to perform circumcision as have shown the necessary skill before a medical board of examiners, and that every time they are called upon to perform the rite, they should submit themselves to a medical

Ritual Circumcision.

examination. Only when bearing a certificate from a regular physician, stating the absolute freedom from specific diseases (tuberculosis or syphilis) should they be allowed to perform ritual circumcision.

As another reliable measure against the possibility of inoculating the child, when the parents insist upon the orthodox method of circumcision, is the suction by the aid of a glass tube, as practised in France and Germany.

CHAPTER X

What Other Forms of Tuberculosis Exist, and What are Their Principal Symptoms?

In the foregoing chapters we have treated of the bacillus of tuberculosis, its mode of entrance into the system, and of the symptoms of the most frequent form of the disease—that is to say, consumption or pulmonary tuberculosis. Now we will consider some of its other forms or manifestations.

Tuberculosis of the Throat.

More closely related to pulmonary consumption than any other form of tuberculosis is laryngeal tuberculosis, also called tuberculosis of the larynx, or tuberculosis of the throat. This disease is not nearly so frequent as pulmonary tuberculosis, but sometimes occurs with it. Besides all the symptoms which tuberculosis of the throat has in common with tuberculosis of the lungs, such as fever, nightsweats, emaciation or loss of flesh, difficulty in breathing, cough, etc., there are in this disease additional symptoms, such as more or less pronounced hoarseness and intense pain during the act of swallowing, which makes eating bread, meat, and other solid food exceedingly difficult. The internal appearance of the throat shows little tubercular growths and ulcers in the region of the vocal cords and neighboring tissue.

Tuberculosis of the Bones.

Tuberculosis of the bones, which not infrequently leads to a total necrosis—that is, a softening and final decay of the bones—is not a rare disease. If the seat of the disease is the spinal column, the decay of one or more vertebræ may result in the deformity commonly known as hunchback. If through this breaking down there should result a compression of the spinal marrow, paralysis of arms or legs, and other disturbances, such as difficulty in retaining the urine and the stools, may be observed.

While tuberculosis of the bones and joints, so frequent in children, is almost painless at the beginning, it may gradually lead to loss of the use of the joints, to maturation and destruction, which may become extensive enough even to make amputation necessary.

Tuberculous Meningitis.

In younger children tuberculous spinal meningitis is not rare, and, alas! very often proves fatal. The essential symptoms of this disease are digestive disturbances (vomiting or constipation), uneasiness and depression, later on paralysis of the extremities, delirium, and sometimes coma (profound insensibility).

Consumption of the Bowels.

More frequent and almost as dangerous as tuberculous meningitis in children, is tuberculosis of the intestines and the peritoneum (the lining of the abdominal cavity). This affection is sometimes also called consumption of the bowels. The most pronounced symptom in such cases is very often a protracted diarrhœa, which cannot be easily controlled by dieting or medication.

Hasty Consumption.

At times the whole body is invaded by the tuberculous disease, and countless little tubercles are distributed in all the organs. The disease is then called "miliary tuberculosis" because the tubercles are like millet seeds. The origin of this disease is probably always due to the sudden outbreak of a localized tuberculous lesion, which had been at a standstill before. The first symptoms of miliary tuberculosis resemble those of typhoid fever. They are generally depression, lassitude, and fever. This is also one of the forms of tuberculosis which often prove fatal.

Lupus.

Of the so-called localized tuberculous diseases, we must mention the form which manifests itself as a skin disease and is known as lupus, showing itself as red, slightly elevated patches, mainly on the face. These patches often undergo ulceration.

So-called scrofulosis, or scrofula, is now considered also as a form of tuberculosis. It appears almost exclusively during childhood. It is a milder disease than the other forms of tuberculosis, and manifests itself mainly in swelling of the glands, eruption of the skin, and inflammation of eyes and ears. Scrofulous children are usually very pale and anæmic.

CHAPTER XI

What Protects the Healthy Individual from Contracting Tuberculosis?

After all that we have said of the contagiousness, or rather the communicability, of tuberculosis, and consumption in particular, one must not think that a breath in an atmosphere accidentally laden with bacilli would certainly render a healthy individual consumptive, or that by a swallow of tuberculous milk or a little injury from a broken cuspidor one must necessarily become tuberculous. The tubercle bacilli which may be inhaled are taken in with the dust. This dust is arrested by countless fine hairs in the nasal cavities, and during the act of blowing the nose this bacilli-laden dust is usually expelled with some of the nasal mucus. When, as it may happen, some bacilli are not caught up by the fine hairs, the very secretions of the nasal membranes being bactericidal, that is to say, having germ-killing properties, can render the bacilli harmless. Even if the germs should have passed these two barriers and have entered the deeper respiratory tracts—the bronchial tubes—these in turn are lined with cilia, very fine hair-like organs which are in constant motion, and which expel foreign bodies with the mucus that the bronchial tubes secrete. Lastly, even should the bacilli enter the lung tissue itself, there again they will meet the white blood corpuscles, and if the latter are plentiful and in good condition, they will overcome the enemy —the bacilli—by swallowing them. The secretions of the stomach of a healthy individual, have, doubtlessly, also bactericidal properties; these gastric juices kill the dangerous germs before they have a chance to do harm. Therefore, the healthy man and woman should not have an exaggerated fear of tuberculosis; they should, nevertheless, not recklessly expose themselves to the danger of infection.

Natural Means of Defense.

CHAPTER XII

How May a Hereditary Disposition to Consumption be Successfully Overcome?

In connection with the precautions which should be taken to combat a tendency to tuberculosis, we must say a few words concerning the curability of consumption or pulmonary tuber-

culosis. The old idea, that a tuberculous individual who has seemingly inherited his tendency to the disease can have no hope of cure, I regret to say, is still very prevalent and deeply rooted in the minds of many people. We desire to emphasize the fact that the chances for a cure of the consumptive individual do not at all depend upon whether he had a hereditary tendency or has accidentally acquired the disease. There are hundreds of cases of healed tuberculosis in men and women who have lived to an old age, and nevertheless their fathers or mothers had succumbed to consumption.

Hereditary Consumption as Curable as Acquired Consumption.

The assumption that tuberculosis is often directly transmitted from parent to child is equally erroneous. Of course, there are in medical literature a few cases which show that such direct transmission is possible, but they are exceedingly rare. When little children have become tuberculous the infection can almost always be traced to the child having slept or been much in contact with a consumptive mother or other consumptive individuals, having been kissed on the mouth, or having played on the dirty, infected floor, etc. All this shows the importance of absolute cleanliness and the strictest hygiene from early infancy.

Hereditary Transmission.

The future mother who fears for her child a hereditary disposition to tuberculosis should lead a very healthful life. She should be as much in the open air as possible, breathe deeply, and eat regularly of plain but nourishing food. Never should she wear garments which constrict any of her chest or abdominal organs. She should replace the corset by a comfortable waist which permits free and deep respiratory movements. Instead of tying her skirts around the waist, she should have them suspended from the shoulders, which can easily be done by attaching buttons to the waist. By wearing a close-fitting union suit for underwear, of linen, cotton, or wool, according to the season, it will be possible to get along with less skirts, and thus lessen the weight around the waist. The whole dress of the mother should be so arranged that there are no constricting bands, and that no organ in the body should be hindered in its free physiological functions. How important a more healthful and natural dress really is for the welfare and development of mankind in general, a mother seldom realizes either for herself or for her daughters. They are all only too often the slaves of fashion. The tightly laced corset should be banished forever from the dress of women. Not only is free and natural breathing interfered with by this article of dress,

but indigestion and disturbances in the circulation follow excessively tight lacing. Anæmia, or poverty of the blood, so often observed in young girls, can very frequently be ascribed to this unnatural mode of dress, which does not permit either a free circulation or sufficient oxygenation of the blood.

Tight Lacing.

We reproduce here three pictures better to illustrate the result of excessive lacing. Fig. 25 shows the situation of the organs in chest and abdomen in a normal thorax. Fig. 26 shows lungs, heart, and intestines as they appear in a thorax

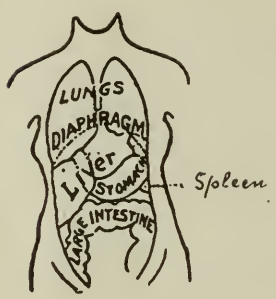

Fig. 25.

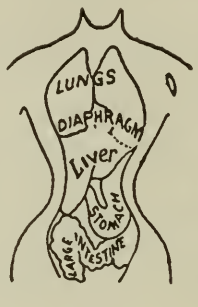

Fig. 26.

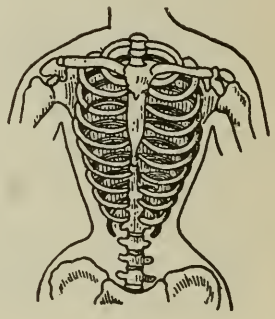

Fig. 27.

Fig. 25.—Normal Chest; Vital Organs in Right Position.
Fig. 26.—Too Tightly-laced Chest; Vital Organs Displaced.
Fig. 27.—Result of Tight Lacing in the Bony Frame of the Chest.

constricted by wearing a tightly laced corset for a number of years. Fig. 27 shows the skeleton of a chest deformed by tight lacing.

It cannot be insisted upon too often that to an individual predisposed to tuberculosis nothing can be more injurious than an interference with proper digestion and assimilation. To keep stomach and bowels in good order is one of the best safeguards against taking the disease.

Children and young adults should not wear narrow suspenders or narrow bands which compress that portion of the chest which contains the apices or summits of the lungs. By compressing these parts the apex of the lungs is prevented from inhaling and exhaling as freely as the lower and non-compressed portion of the lung. It is possible that herein we find an explanation why consumption usually begins in those regions. To obviate this danger I have devised a garment which I call a suspender-vest. The accompanying illustration (Fig. 28) is self-explanatory.

Neckwear, for men as well as for women, should be loose.

Too high, too tight, and constricting collars or bands around the neck may cause an insufficient air-supply, congestion of the arteries of the brain, and subsequently headache and dizziness. To dress the neck too warmly lessens the power to resist taking cold when there happens to be a change in the atmosphere. The less one is accustomed to bundling up the neck, the less liable will one be to take cold. **Neckwear.**

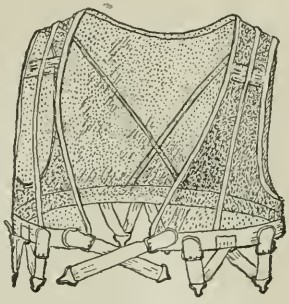

Fig. 28.—Suspender Vest.

Ladies cannot be told too often to abandon the unhygienic fashion of trailing dresses, at least in the street. They should be brave and show the world that they care for the health and welfare of others. When one considers how many millions of dangerous bacilli and micro-organisms are gathered up with the dust and brought into the house by this unhealthy mode of dress, further argument is hardly necessary to prove that the wearing of trains is absolutely dangerous to health. As the poet of the London *Truth* puts it in his "Song of the Skirt," why should dresses be made to do "the scavenger's dirty work": **Trailing Skirts.**

"Sweep—sweep—sweep—
Where the waste of the street lies thick,
Sweep—sweep—sweep—
However our path we pick;
Dust, bacillus, and germ,
Germ, bacillus, and dust,
Till we shudder and turn from the sorry sight
With a gesture of disgust.

"Oh, men with sisters dear!
Oh, men who have well-dressed wives,
It is not alone an expensive mode,
It is one that hazards lives!
For malignant microbes swarm
In the triturated dirt,
And the dress that sweeps it up may prove
A shroud as well as a skirt!"

Footwear is also a matter of importance. Shoes should never be worn too tight or with too high heels. They not only hinder free movements, but the constriction of the blood-vessels causes impaired circulation and coldness of the extremities. **Footwear.**

If it is found necessary to wear underwear at night, a different set should be kept for that purpose, which, with the

night-dress or night-shirt, should be well aired during the day-time.

For the average individual in most climates linen-mesh is perhaps best suited for underwear. It allows the skin to breathe (for it must be remembered that the skin is a respiratory organ). When the individual perspires, the linen-mesh dries more quickly than other material and prevents the wearer from becoming chilled. In very cold weather, when the heaviest linen-mesh undershirt does not seem warm enough, an additional undershirt of cotton or light wool can be worn over the linen-mesh.

The marriage of uncured tuberculous individuals should be discouraged, and when married people contract tuberculosis they should seek the counsel of a physician as to the advisability of having children.

Hygiene and Care of the Child of a Tuberculous Mother.

Whenever a child-bearing mother is found to have tuberculosis or a strong tendency to tuberculous disease, the child should be given a healthy wet-nurse, or be fed artificially with modified cow's milk. The advice of the physician is indispensable under such circumstances. The child should have its own bed, and should never, never sleep in the same bed with the mother. The bedroom should always be well ventilated, and the child should be taken into the open air as soon as practicable. The old-fashioned habit of enveloping the child's head in a thick veil should be abandoned. It is a good plan to let the little one play about naked, or with only a little shirt on, for a while every day in a warm, sunny room. A clean sheet should be stretched over the carpet or rug or, if the floor is bare, a blanket can be placed under the sheet.

Sun and Air Baths for little Children.

From the tenth to the twelfth month one should accustom the child gradually to cold baths. The best way to begin is to rub the child a few times with the hands dipped in cold water after its daily warm bath, and then wipe it rapidly. By and by one may begin with cold sponging, and later on with a little douche. In the use of cold water it is absolutely necessary that the reaction should follow rapidly. This reaction is manifested by a pleasant warmth perceived by the child, and externally is made visible by a reddish appearance of the skin. Whenever cold water is applied to the skin one will notice at first a certain whiteness or pallor, which is caused by a contraction of the external blood-vessels. The return of the blood to the external surface causes the reddening of the skin. When-

Use of Cold Water.

ever reaction is lacking or tardy, the advice of the physician should be sought.

Though the application of cold water is beneficial, one should never forget that there are people with different constitutions, and that a routine treatment is not applicable to every individual. The careful, judicious, and regular application of cold water is perhaps one of the best preventive measures against taking cold, for children as well as adults, and its use generally should be more recommended. Persons not accustomed to the use of cold water can easily become so by being rubbed every day with alcohol for a week or so. During the second week they should be rubbed with half alcohol and half water, and the third week with water alone. By this means one gradually educates one's self to the use of cold sponge baths, ablutions, and douches.

Every family does not have the luxury of a douche apparatus, and sometimes not even a bathroom. For such I wish to describe a simple method which will answer the purpose. Take a large circular English bath-tub, about three feet in diameter and ten inches high, and pour about five inches of cold or tepid water into it. The bather jumps into the water, keeping his feet in motion for a few seconds, and pours one or two pitcherfuls of water quickly over each shoulder, or squeezes out a big sponge soaked in cold water, over the back, the right and left shoulder, thoroughly wetting the whole body. Unless the patient can remain indoors after the bath so that the hair can dry thoroughly, it is better not to wet the head. The temperature of the water may vary from 60° to 40° F. The room in which the bath is taken should be warmed in cold weather. The best and, perhaps, also most convenient time to take a cold bath is in the morning before dressing, or in the evening before retiring. Whenever reaction is feeble, that is to say, when a pleasant feeling of warmth after the bath does not come quickly enough, one should proceed as follows: If the bath is to be taken in the morning, rise half an hour earlier, cover the bed so that the warmth is retained; then, after the application of cold water has been taken rapidly in the manner above described, rub with a rough Turkish towel and return as quickly as possible to the warm bed. If it is not practicable to take the bath in the morning, one can obtain the same result by going to bed half an hour earlier, and when the bed is warm rise again to take the cold-water application. In most cases the return to the warm bed

Improvised Douche.

How to Help Reaction

will assure a thorough reaction; but if these precautions, in addition to vigorous friction after the bath, do not suffice to produce a proper reaction, it is a sign that the body has not enough resistance for this kind of treatment, and the physician should be consulted.

Cold baths, especially bathing in a river or in the ocean, are, of course, to be recommended in warm weather. Weakly and elderly persons should not take cold baths, no matter at what season, unless permitted to do so by their physician.

Warm Baths.

To keep the skin clean and in good condition, cold baths, even when taken every day, are not always sufficient, and soap and warm water should be used at least once a week. The warm bath should always be followed by a rapid sponging off with cold water. Outdoor life as many hours as possible, and when it is necessary to be indoors to have the air as fresh and pure as may be, is a most important factor to overcome a predisposition to tuberculosis. When one is obliged to be indoors, the room in which one works or lives should be well ventilated. The simplest manner of ventilation is to have the windows open. The accompanying illustration (Fig. 29) gives a simple but effective lesson in ventilation.

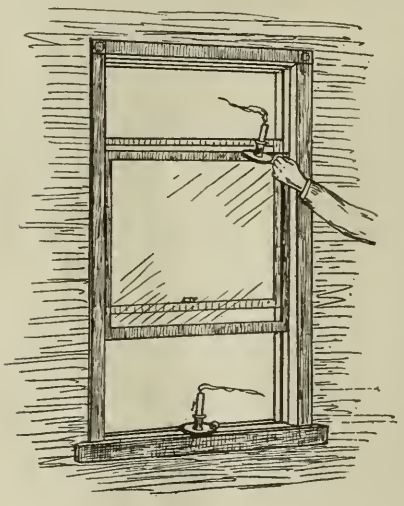

Fig. 29.—A Lesson in Ventilation. On a calm, cool day, when there seems to be no current of air, the direction in which the air moves in a room can be shown by holding a lighted candle before an open window or door; when the candle is held low down the flame will point into the room, and when held up high it will point out. (Committee for Prevention of Consumption of the Associated Charities, Wash., D. C.)

Not only during the day, but also at night, one should live in as fresh and pure air as possible. The still very prevalent idea that night air is injurious is wrong. The night air is as pure as that of the day, particularly in great cities where there is less dust-producing traffic at that time. Therefore one should always keep at least one window open in the bedroom or in an adjoining room, and thus assure a sufficient and permanent ventilation. Of course, it is always wise to

Relative Purity of Night Air.

protect one's self against direct draughts from the open window. When it is not possible to place the bed so that it will be out of the draught, a screen in front of the open window will suffice for protection.

Excessive Dryness and Heat in Dwellings.

In many American dwellings the air is kept too hot and too dry during the winter. A temperature of from 65° F. to 68° F. should be sufficient, especially when care is taken that the heat produced by the furnace is not too dry. The excessively dry atmosphere of many city and country homes in winter often gives rise to nasal catarrh, a condition which everybody,

Fig. 30.—Humidifier.

but especially those suffering from pulmonary diseases, or prone to them, should be anxious to avoid. Besides keeping the water pan in the furnace constantly filled, there should be in the sitting-room and sleeping-rooms some humidifying arrangement such as is pictured here (Fig. 30). More simple evaporating devices, however, such as a vessel filled with water and a cloth suspended above it touching the water so as to produce capillary attraction, will answer the purpose of rendering the atmosphere sufficiently humid.

Possible Results of too Dry and Overheated Atmosphere.

Experience has proved that we can be perfectly comfortable in a temperature of 65° F. and even a little lower, provided that the relative percentage of moisture is 60. If this moisture falls to 30 or to 20 per cent., then the dry throat, dry nose, and dry skin are in evidence. The explanation is simple. The dry air absorbs the moisture from the body and causes discomfort. The drying of mucous membranes in this way lays them open to the invasion of the organisms causing colds, grippe, pneumonia, and tuberculosis. I reproduce here an

instrument which will be helpful in determining the relative humidity. It has been strongly recommended by the Indiana State Board of Health, in its monthly bulletin, under the name of Direct Reading Hair-Hygrometer. Fig. 31 is a picture of this moisture indicator. Every household, every schoolroom, and every workroom should have one of these instruments, for it is a fact that the humidity of the air is of as much importance as the temperature. This hygrometer is not absolutely accurate, but is sufficiently so for practical purposes. Indeed, it is as accurate as the ordinary thermometer. If the matter of humidity was carefully attended to by every one, there would be a decided improvement in the general health and a very great lessening of diseases of the air passages.

Fig. 31.

Respiratory Exercises with Movement of Arms.

As soon as the intelligence of the growing child will permit, it should be taught to breathe deeply, and later on be taught to take the following breathing exercises, which the child should learn to love as the average boy or girl loves general gymnastics. In front of the open window or out of doors assume the position of the military "attention," heels together, body erect, and hands on the sides. With the mouth closed take a deep inspiration (that is, breathe in all the air possible), and while doing so raise the arms to a horizontal position; remain thus holding the air inhaled for about three to five seconds, and while exhaling (breathing out) bring the arms down to the original position. This act of exhalation, or expiration, should be a little more rapid than the act of inspiration. When the first exercise is thoroughly mastered and has been practised for several days, one may begin with the second exercise, which is like the first, except that the upward movement of the arms is continued until the hands meet over the head.

The accompanying illustration (Fig. 32) shows the positions which are to be taken during those two exercises.

The third respiratory exercise is taken in the following way: One places the hands one above the other in front of the chest, with the fingers bent (Fig. 33). The arms and shoulders make a backward movement, the hands moving apart with a

motion as though wanting to tear open the chest (the fingers remaining bent), while a deep inhalation is taken. Hold the breath, counting four by tapping the chest four times with both hands, and at the fifth second start to exhale, bringing the hands and forearms into the position from which they started. This exercise has the advantage that it can be taken in the sitting position, or even when lying down on the back.

The fourth breathing or respiratory exercise, which requires more strength and endurance, should not be undertaken until

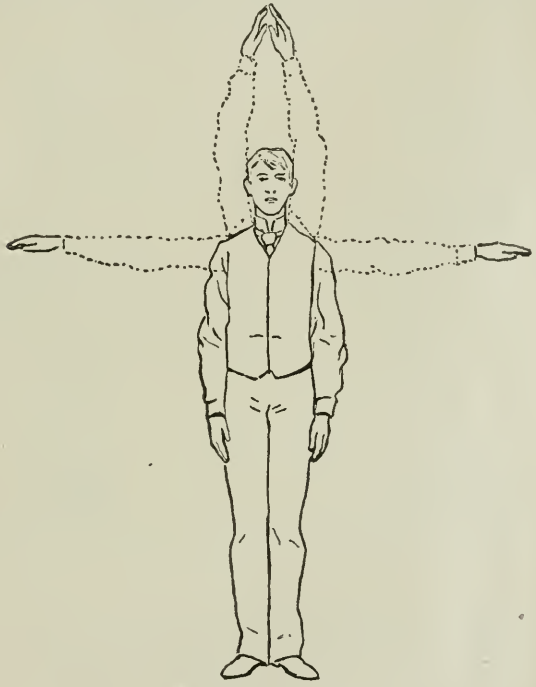

Fig. 32.—First and Second Breathing Exercises.

the first three have been practised regularly several times a day for a few weeks, and until an evident improvement in breathing and general well-being has been observed. We will endeavor to make this fourth exercise, which might be called a dry swim, more comprehensible by the illustration (Fig. 34). Take the same military position of "attention," and then stretch the arms out as in the act of swimming, the backs of the hands touching each other. During the inspiration move the arms outward until they finally meet behind the back. Remain in this position a few seconds, retain the air, and during exhala-

tion bring the arms forward again. This somewhat difficult exercise can be facilitated and made more effective by rising on the toes during the act of inhalation, and descending during the act of exhalation.

Respiratory Exercises without Movement of Arms.

Of course, when out of doors one cannot always take these exercises with the movement of the arms without attracting attention; under such conditions raise the shoulders, making a rotary backward movement during the act of inhaling; remain in this position, holding the breath for a few seconds, and then exhale while moving the shoulders forward and downward,

Fig. 33.—Third Breathing Exercise.

Fig. 34.—Fourth Breathing Exercise.

assuming again the normal position. This exercise (Fig. 35) can easily be taken while walking, sitting, or riding.

Young girls and boys, and especially those who are predisposed to consumption, often acquire a habit of stooping. To overcome this the following exercise (Fig. 36) is to be recommended. The child makes his best effort to stand straight, places his hands on his hips with the thumbs in front, and then bends slowly backward as far as he can during the act of inhaling. He remains in this position for a few seconds, while holding the breath, and then rises again somewhat more rapidly during the act of exhalation.

The following general rule concerning breathing exercises should always be remembered. Commence with the easier exercises (Figs. 32, 33, and 35), and do not begin with the more difficult ones (Figs. 34 and 36) until the former are completely

mastered. Take from three to six respiratory exercises, either of one kind or the other, every half hour, and continue this practice until deep breathing has become a natural habit. These exercises should always be taken in an atmosphere as fresh and as free from dust as possible. Never take these exercises when tired, and never continue so long as to become tired.

General Rules Concerning Respiratory Exercises.

Fig. 37 shows a group of tuberculous patients at the Riverside Hospital-Sanatorium on North Brother Island, N. Y., taking respiratory exercises under their physicians' direction.

Fig. 35.—Breathing Exercise with Rolling of Shoulders.

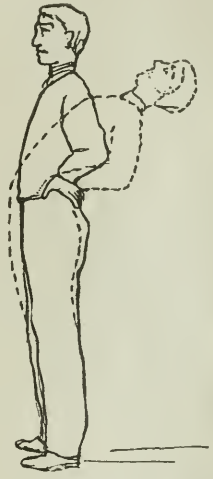

Fig. 36.—Exercise for People in the Habit of Stooping.

Causes of Mouth-Breathing.

Mouth-breathing in children, and sometimes in adults, is often caused by certain growths in the throat (adenoid vegetation), by enlarged tonsils, or by growths in the nose (polypi, etc.). The removal of these obstructions by surgical aid is perhaps the only rational method to assure natural breathing. Incidentally we may be permitted to say that such operations are not at all dangerous; but by the presence of these vegetations in the throat (retropharynx), the hearing and the intellectual and bodily development of the child may become seriously impaired. The early removal of such growths should be earnestly recommended. The respiratory exercises just described are particularly useful for children after an operation, otherwise they might retain the habit of imperfect breathing which they had acquired.

Among exercises which have a tendency to develop and

strengthen lungs and throat, we will also mention singing and reciting in the open air.

Crowded Rooms and Smoking.

It is, of course, self-understood that all individuals who have an inherited disposition to tuberculosis should endeavor to live as much as possible in good, fresh, pure air. To visit dancing-halls, saloons, and smoking-rooms can only be deleterious to such people. Smoking should be prohibited for young men with weak chests, and for all people having a tendency to tuberculosis. The smoking of cigarettes is particularly dangerous, since the habit once acquired tends to undermine even a strong constitution.

Raising and Educating Predisposed Children.

The proper bringing up of children that have a tendency to become tuberculous is of the greatest importance. Many are poor eaters from the day of their birth. Discipline, not to allow too many sweets, to observe regular meal-times and to keep the bowels in good condition, are the best means to combat a dislike for eating. Children should, as early as possible, be taught to clean their teeth thoroughly after each meal, for a good digestion is dependent upon the condition of the teeth. The dislike to play outdoors, which is so characteristic of the little candidates for tuberculous diseases, can also be overcome only by discipline. To dress them too warmly and bundle them up all the time is as injurious as having them remain most of the time indoors. Such children should not work too hard during their school age. Open-air schools are the ideal for children predisposed by heredity. To spend too many hours sitting down, to do too much brain work, to spend too much time at the piano or in other musical studies, have a tendency to weaken seriously the child predisposed to tuberculosis.

The more open-air schools we have, not only for the tuberculously inclined child, but for all children, even those in the best of health, the more effectually will we decrease tuberculosis in adult life. The accompanying pictures of open-air schools, Figs. 38 and 39, give a good idea of how these schools should be conducted. These illustrations appeared first in the admirable report of Mr. Kingsley of the Elizabeth McCormick Open Air School of Chicago.

Gymnastic exercises should be recommended to young people of both sexes and young girls especially should continue their healthful outdoor sports after they have left school. Of course, excesses are injurious in everything, and we wish to say here that, no matter how healthful a sport may be, if carried on too violently or for too long, it must ultimately prove injurious.

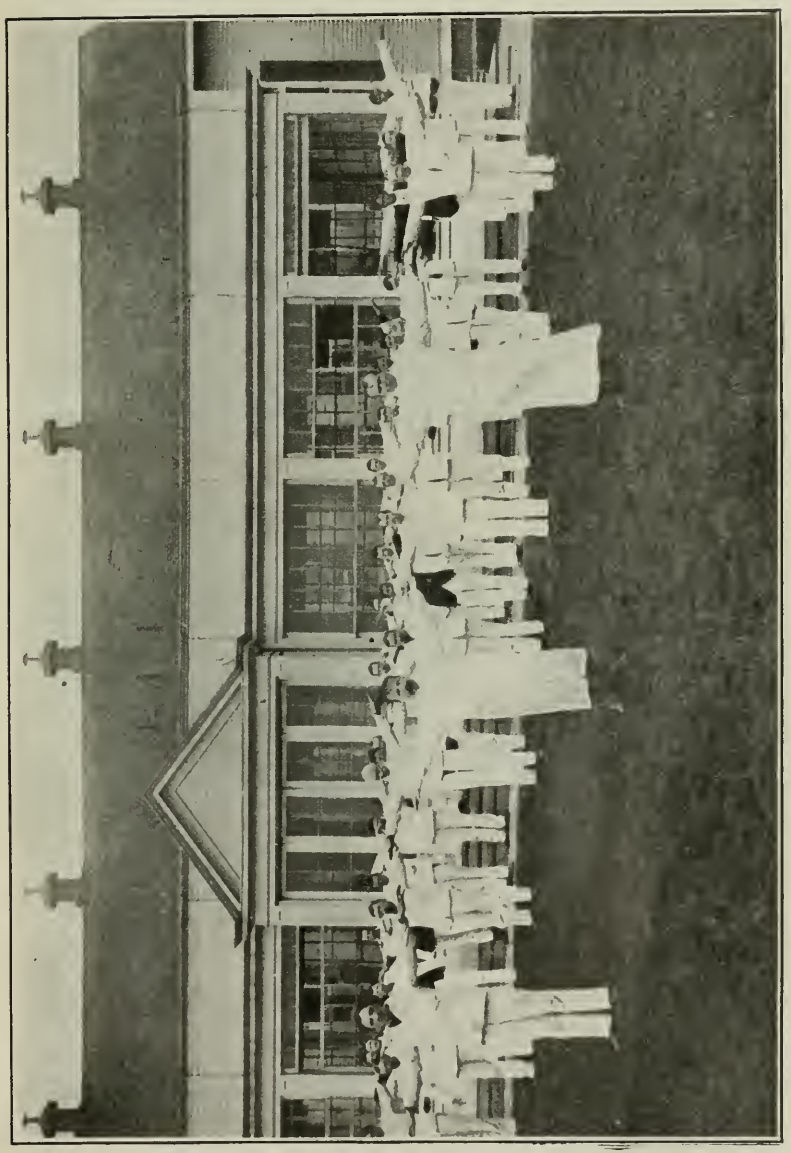

FIG. 37.—Patients at the Riverside Hospital-Sanatorium on North Brother Island, taking Respiratory Exercises under their physicians' directions.

To be cheerful, to live a regular life, to eat plain but good food, to drink plenty of good, pure water between mealtimes, and a moderate amount with meals, to avoid all alcoholic beverages, to see that the bowels move freely every day, to keep the whole body clean, and to sleep at least eight hours out of twenty-four, is the best way to remain well.

To keep the teeth in good condition is essential for young and old. One should always bear in mind that without good teeth digestion cannot be perfect, that imperfect digestion leads to debility, and that debility produces a suitable field for the growth of the dangerous and very prevalent germs of consumption.

Once more we desire to call attention to the clothing of growing girls and boys. The material of the garments should be according to the season, and they should always be made so that every movement of the body may be free, and none of its functions, such as respiration, digestion, etc., in any way interfered with.

Choice of Occupation.

When the time comes to choose a profession or trade for a young man who has a tendency to tuberculosis, one should bear in mind that gardening, farming, forestry, and all occupations which demand an outdoor life, are the most likely to make him a strong man and a useful member of society.

CHAPTER XIII

How Can a Predisposition to Tuberculosis be Acquired When it is not Inherited?

1. By the intemperate use of alcoholic beverages, a dissipated life, excesses of all kinds, etc.

2. By certain diseases which weaken the constitution; for example, pneumonia, typhoid fever, smallpox, measles, whooping cough, syphilis, influenza, grippe, etc.

3. By certain occupations, trades, and professions, such as printing, hat-making, tailoring, weaving, and all occupations where the worker is much exposed to the inhalation of various kinds of dust; as bakers, millers, confectioners, cigar-makers, chimney-sweepers, and the workers in lead, wood, stone, metals, etc.

4. By poverty, want, underfeeding, bad housing, bad ventilation.

Copyrighted by United Charities of Chicago.

FIG. 38.—Open Air—Open Minds.

Copyrighted by United Charities of Chicago.

FIG. 39.—A Schoolroom Where the Ventilation Affords no Difficulties. (From "Open-Air Crusaders," by Sherman C. Kingsley.)

CHAPTER XIV

How may an Acquired Predisposition be Overcome, and Unhealthful Occupations Made Relatively Harmless?

All persons who have been weakened through intemperance or excesses, who are convalescent from serious diseases, or who are suffering from the effects of harmful occupations, should be particularly careful not to expose themselves to infection. For the intemperate man, the fast liver, or one inclined to excesses, there is no remedy except to change his mode of life.

Tuberculosis and Venereal Diseases.

The unfortunate who by his own fault or the carelessness of others has fallen a victim to a venereal disease (syphilis, etc.) we would urgently recommend to submit himself to thorough treatment by a competent physician. For the comfort of these unfortunate sufferers, we desire to say that all venereal diseases can be successfully treated when the patient seeks timely medical advice and faithfully obeys the physician's instructions. Since venereal diseases are highly contagious, the physician's instructions will also protect others from becoming infected, and the patient himself from reinfection. The necessity of seeking medical advice holds good for all those who by disease, intemperance, or excesses of any kind have undermined their constitution, and thus diminished their natural resistance to the invasion of the tubercle bacilli.

Hygiene in Factories, Workshops, etc.

In many States of the Union there now exist laws whereby the sanitary conditions of factories, workshops, department-stores, etc., are assured. Of course there is room for much improvement in this respect, especially in regard to light and sufficient ventilation in factories where dust and gases are a constant menace to the laborer. Whenever practicable, respiratory masks for protection against particularly irritating dust should be worn. People much exposed to the inhalation of flour dust should clean their teeth thoroughly (the inside as well as the outside). By removing the flour dust from the spaces between the teeth, the formation of glucose (sugar) through the action of the saliva on the flour is avoided, and thus the germs of fermentation are deprived of a favorable soil for development.

In all these matters the laborer can help himself a good deal by his own efforts to make a seemingly dangerous occupation

more safe. During the hours of recess, and before he goes to work as well as afterward, he should always strive to be as much as possible in the open air, drink plenty of pure, clean water, keep early hours, live as regular a life as possible, avoid the saloon, and never take alcoholic beverages. **Self-Help of the Laborer.**

All the other hygienic precautions and means of improving the general health of which we have spoken in Chapter XII, "How may a hereditary disposition to consumption be successfully overcome?" such as breathing exercises, the use of cold water, etc., are, of course, just as essential to combat a disposition to tuberculosis which has been acquired.

What might be done and whose duty it should be to diminish poverty and want, bad housing and underfeeding, to do away with child labor, etc., we will endeavor to outline in the subsequent chapters, beginning with the duties of the employers regarding the solution of the tuberculosis problem.

CHAPTER XV

What can Well-meaning and Conscientious Employers in City and Country Do to Help Combat Tuberculosis?

All who employ people as laborers or servants should bear in mind that unhealthy, dark, damp, and badly ventilated rooms are powerful factors in the propagation of tuberculosis. The soil upon which a dwelling for human beings is to be built, should be dry, free from miasms and dangerous exhalations. High, porous ground is particularly to be recommended. It is sometimes possible to render a damp soil healthful by thorough drainage and cementing. The house should always be built of good material, and all the rooms should receive the light of day and as much sunshine as possible. In winter the rooms should be well warmed, but not overheated, and at the same time free ventilation should be made possible. Bathrooms in sufficient number should be in all houses, and each family should have its own water-closet, which, of course, must always be kept in good condition. **Sanitary Dwellings**

Factory, store, and office hygiene and sanitation should not be merely a matter attended to because of laws enacted and enforced by state or city; this should be done because of mutual benefit which is thereby enjoyed by employer and employee.

In labor colonies and densely populated tenement districts,

Bathing Facilities.

where modern bathing facilities cannot be easily installed, there should be public places where, for a moderate price, people can enjoy the cleansing and refreshing luxury of a warm or cold bath. Thanks to the tireless labors of Dr. Simon Baruch, a number of such public baths have been established in New York, Chicago, and other cities of the Union.

In factories, workshops, big stores, etc., there should always be a sufficient number of well kept spittoons, preferably elevated and of unbreakable material. Wherever such precautions are taken and some conspicuous signs put up forbidding expectorating on the floor, and if necessary making it punishable by law, promiscuous spitting will soon cease, and an important point in the combat of tuberculosis will be gained.

Regularity of Meals.

All employees, men and women of whatever class, should be allowed ample and regular time for their meals. These should never be taken in the workshops, but special rooms should be kept for that purpose. Opportunity should be given to the workers to rest or walk in the open air for a little while after their meal. It is also of importance for the health of the laborer to wash his hands thoroughly before touching food, and proper conveniences should be provided for that purpose. Factories, workshops, large or small stores, etc., should, of course, be well ventilated, but it is particularly necessary that they should be thoroughly aired after working hours. These precautions apply not only to large establishments, but to the smallest concern with one or two employees as well, and every employer should bear in mind that a healthy laborer is of

Overwork.

greater value than one who is overworked, underfed, or badly housed. Lastly, employees should not be overworked. There should be reasonable hours for all, so that the laborer may enjoy the bodily and mental rest which is essential to the preservation of health. The germs of any disease, but particularly

Child-labor.

those of tuberculosis, will always find a more congenial soil for development in an overworked and enfeebled system. Child-labor, that is to say, the employment of children under fourteen years of age, in factories, workshops, mines, etc., should be prohibited by law. The child is more susceptible to tuberculosis than the adult, especially when its delicate growing organism is subject to continued physical strain.

Before ending this chapter I will speak of another matter, most important in the prevention of tuberculosis, in which no one can be more helpful than the well-meaning employer. I refer to the careful examination of every one before being

employed in workshop, factory, store or office, or as servant in a family. In this way a patient, whose disease is in a stage in which he needs treatment and care, or may be a source of infection to others, may be excluded. This is particularly necessary when the work expected of the applicant is hard and when he is placed in close contact with other workmen.

Examination and Re-examination of Employees.

To prevent tuberculosis in places where many people work, it is not enough merely to examine the employee on entering, it will also be necessary to re-examine all the workers at least once, but better yet, twice a year in order to find out whether tuberculosis may not have developed since their entrance. Besides this, the employees should have the privilege to call on the factory physician at any time for examination if a suspicious symptom should show itself.

It will be in the interest of the employer to engage a physician to teach the employees about tuberculosis by lectures on the subject. They should learn how they can help lessen the spread of the disease. But this is not all the employer has to do. It will be necessary for him, when one of his employees is found to have consumption, to see that he receives immediate care and treatment at his home or in a special institution. The kind employer who has the welfare of his workers at heart will not even content himself with that, but will also see that his employee's family, now deprived of its breadwinner, will not be in want. Whether the employee, if found tuberculous, can be treated at home or must be sent to a special institution, will depend on circumstances. In some instances it may be advisable for the patient, when cured, not to return to the same occupation, but to seek outdoor employment or lighter labor.

Education and Care of Employees.

An excellent example of a large corporation realizing its obligations towards its employees was recently manifested by the Metropolitan Life Insurance Company. The officials of this company obtained permission from the Commissioner of Insurance of the State of New York to establish and maintain a sanatorium for the treatment of their tuberculous employees. A model sanatorium is now in course of construction for this purpose at Mount McGregor, Moro County, N. Y., the spot made historic by President Grant's last residence. Let us hope that many other companies employing large numbers of people will emulate this example.

Sanatorium for Employees.

CHAPTER XVI

What can the Farmer and Dairyman Do to Diminish the Frequency of Tuberculosis among Animals, and thus Indirectly Stop the Propagation of the Disease among Men?

The farmer or dairyman who employs help should, of course, be as anxious for their physical welfare, their proper housing and proper food, as the employer in the city. The dairyman or the farmer who keeps cows, should, however, be particularly desirous to help in combating tuberculosis among animals and thus also among men.

Tuberculous Infection of Cattle.

Everybody who has anything to do with cows should be acquainted with the nature of tuberculosis in cattle, also known by the name "bovine tuberculosis." In animals as well as in man the direct cause of this disease is the tubercle bacillus. Bovine tuberculosis is prevalent in nearly every country. The symptoms of the disease are much like those in man. They begin with relatively slight functional disturbances. The way the germ of tuberculosis is transmitted from animals to men, and also from men to animals, has already been explained. The contagion, or rather the propagation, of the disease among animals takes place in various ways: First, by drop infection, that is to say, little particles which are expelled during the cough. Secondly, by the discharge from the lungs, or also from the glands of the throat, coughed up in the ordinary way. Thirdly, through tuberculous matter coming from the bowels. Fourthly, through secretions coming from the sexual organs (vagina and uterus). Fifthly, through the milk if the udder is tuberculous, or if the whole body of the animal is invaded by the disease. Finally, the disease may be directly transmitted from the tuberculous cow to the calf.

As to the frequency of the various ways in which the contagion takes place and the best methods of prevention, the author does not believe that he can do better than to refer any one interested in the subject to the very "Practical Suggestions for the Suppression and Prevention of Bovine Tuberculosis," issued by Dr. Theobald Smith, of the Bureau of Animal Industry in Washington. By applying to the Bureau the desired information will be sent free of charge.

Of course, it is essential that no consumptive, no matter in what stage of the disease, should be permitted to enter a cow stable. To have cows attended to by tuberculous help is absolutely dangerous. Expectorating on the floor of a stable should be as strictly prohibited as in the dwelling of man. If there is any disease such as diarrhœa, fever, etc., about the dairy or farm, the physician should be called in. Medical advice should also be sought in cases of slowly healing ulcers and sores. Scrupulous cleanliness in the handling of milk and butter in dairies is, of course, essential, and all the vessels used should be thoroughly cleaned with hot water before being used again.

Tuberculosis in Swine.

Tuberculosis among swine is not so rare as is usually assumed. While the disease among cows may not always be recognized by the loss of fat and general bad appearance (for even tuberculous cattle can be fatted), in swine tuberculosis manifests itself at a very early date by a marked emaciation (loss of flesh). Very often these swine are then quickly slaughtered and the meat made into sausages. That through such procedures the health of the consumers is endangered is evident, especially when one considers that many kinds of sausages are eaten without being cooked. Tuberculosis among young swine manifests itself most frequently in the form of intestinal troubles. The main symptoms of the disease are the loss of flesh and bad appearance already mentioned, a pale mucous membrane—that is to say, the inner lining of the mouth loses its reddish color—a marked diarrhœa, flatuency and discharge of gases. If there is tuberculosis of the lungs, cough and vomiting are additional symptoms. In both forms of tuberculosis a swelling of the glands around the neck is often observed. When these animals are slaughtered, one can see little tubercles or elevations and ulcerations along the inner walls of the gut, and on the surface of the lungs. As soon as the disease is discovered among the animals, the sick swine should be separated from the healthy ones. A veterinarian should then be consulted, who will give directions for the destruction of the tuberculous meat and the disinfection of the sties.

The prevention of tuberculosis among swine is not so difficult when one thinks of the causes of the disease. A sucking pig can be infected by a tuberculous sow. The most frequent source of tuberculosis among hogs, however, comes from feeding them on skimmed milk and other dairy products from tuberculous cows. A few cases are also known where hogs

became tuberculous from eating the expectoration of consumptives.

Tuberculosis in Horses and Other Animals.

Tuberculosis in horses is rare and difficult for a layman to recognize. When a horse with a seemingly good appetite has a bad appearance and loses flesh, tires easily, and is short of breath, one should think of tuberculosis. Much urinating and a high temperature (fever) are additional symptoms of tuberculosis in horses. When such conditions are discovered, it is, of course, self-evident that the animal should be isolated until the veterinarian arrives.

Tuberculosis among goats is extremely rare. In the few cases which have been recorded the origin of the disease could be traced to the ingestion of milk from tuberculous cows. Dogs take the disease when living with consumptive people, and the infection probably takes place through ingesting and inhaling infected substances.

CHAPTER XVII

What are the Occupations in Which Tuberculous Invalids, Even in the First Stages of the Disease, Should Not be Employed?

There are certain occupations, especially those that require a long sojourn in the open air every day without too much bodily exertion, which tuberculous invalids in the first stages of the disease may be permitted to follow in their own interest as well as in that of their fellow-men. There are, on the other hand, certain occupations which should never be permitted to consumptives. What we have said in the preceding chapter concerning tuberculous help about cow stables and the possibility of their propagating the disease, is, of course, also applicable to milk dealers, butchers, cooks, bakers, confectioners, and all who have to do with the preparation or sale of food substances. For bread to be handled by tuberculous bakers or bread dealers is dangerous. The possibility of infection is evident when one considers through how many hands the bread passes before it enters the mouths of the consumers, and that, probably, nobody ever thinks of cleaning the bread before eating it. A very recommendable practice is now in vogue in some of the large bakeries in connection with the handling and transporting of bread. The moment the bread comes

Handling of Food Substances, Bread, etc.

out of the oven, while it is still too hot to be handled it is placed, by the aid of a shovel, upon a piece of wrapping-paper large enough to envelop the whole loaf. By twisting the two ends of the wrapper the bread is completely enclosed.

The most scrupulous cleanliness should be practised wherever articles of food are handled or exposed for sale. We have already mentioned in Chapters XII. and XIII. that certain occupations, such as those of tailors, stone-cutters, printers, and cigar-makers, render weak individuals particularly prone to consumption; therefore, any one inclined to this disease should, in his own interest, never pursue such an occupation.

Because cigarmakers almost invariably moisten the last leaves with saliva in finishing the cigar, tuberculous individuals should never be employed at this trade.

Lastly, we must mention one more occupation in which tuberculous individuals should never engage, namely, that of keepers of animals in menageries. Large animals, such as lions and tigers, also the larger and smaller classes of apes, are subject to tuberculosis when in captivity. There is no doubt that an ape-house visited by thousands of people, old and young, every day, must be considered dangerous and capable of propagating the germs of tuberculosis among the visitors if some of the animals should be tuberculous.

CHAPTER XVIII

What are the Main Signs and Symptoms of the Beginning of Consumption or Tuberculosis of the Lungs?

In Chapter I. we have named the important symptoms of pulmonary tuberculosis when fully developed, but because it is so important that the disease should be known as soon as possible, we will answer this question now somewhat in detail. The symptoms of an early pulmonary tuberculosis are often so obscure and manifest themselves so insidiously that they are frequently overlooked by the patient as well as by his friends. Since, however, the cure of the patient depends upon the early discovery of the disease and a timely treatment, we will here describe such symptoms as may be recognized by the layman.

Early Symptoms Recognizable by Laymen.

The man, woman, or child with a hereditary predisposition to consumption often has a narrow chest and stooping shoulders. While a slow, gradual emaciation and loss of weight

may at times be observed, this is by no means a rule. One occasionally sees tuberculous patients who present a relatively good appearance during the first stage of the disease. Paleness of the skin, at times, with bright red cheeks, is, however, a rather common early sign. A marked inclination to frequent catarrh is often present, and the character and disposition of the individual may change when the disease comes to an outbreak. There is a dislike to work, also to the pleasures and occupations which the invalid formerly loved to pursue. He will probably also complain of getting tired easily. In the afternoon hours he will have a light fever, and a hacking cough in the morning or evening. In the morning he may have a chill, sometimes there are streaks of blood in the sputum, but neither the patient nor his friends should be alarmed at the sight of a little blood in the expectoration. This is not nearly so dangerous a symptom as is usually supposed by the laity, and a hemorrhage does not by any means lessen the chance for recovery. Dyspepsia and loss of appetite, palpitation of the heart and pains in the chest, are also symptoms of importance. Of course, some or several of these signs and symptoms may also be the indication of the approach of other diseases than tuberculosis or the lungs. The presence of such symptoms should, however, serve to all, whether predisposed to tuberculosis or not, as a warning to seek medical advice. Especially persons who cough more or less continually should submit themselves to a thorough examination. The science of medicine has made such progress that the recognition of a beginning tuberculosis of the lungs no longer presents any difficulty; therefore, whenever there is a suspicion of the beginning of consumption, the calling in of a physician may assure cure and restoration to health, and if no tuberculosis is present the medical examination will quiet unnecessary fears.

The careful microscopic examination for the presence of the bacilli of tuberculosis in the spittle of a person suspected of having pulmonary tuberculosis is of the greatest value. But it must be borne in mind that the patient may be afflicted with this disease even though no germs are found in the spittle. It is best and safest to observe all the precautionary measures, whether bacilli are found or not.

CHAPTER XIX

What are the Early Symptoms of Other Forms of Tuberculosis?

Early Symptoms of Other Forms of Tuberculosis.

In case of tuberculosis of the throat, the general symptoms are about the same as those just described for the beginning of consumption of the lungs; but in addition there will be a certain hoarseness and roughness of the voice. Pain in swallowing very hot and cold liquids or hard food may also sometimes be observed in the early stage of this disease.

The early symptoms of tuberculosis of the bones and joints manifest themselves in lameness and easy tiring of the arm or leg affected. A light pressure in the region of the joints causes a sudden severe pain. If the spinal column is affected, the symptoms will depend upon the location of the vertebra which is attacked by the disease. For example, if this should be in the region of the neck, there will be difficulty in swallowing, in breathing, or a frequent dry cough. If any one of the vertebræ in the region of the chest is affected, a feeling of constriction like a tight band around the chest will be observed, accompanied often by digestive troubles. If the seat of the disease is the lower portion of the spinal column, there will be irritation of the bladder and lower bowels, an inclination to much urinating, and radiating pains toward the hips.

It is self-understood that when any of these symptoms are discovered the physician should be called in, for only through the most careful treatment can a patient be saved from a lasting deformity.

The bone-and-joint tuberculosis is most frequent during childhood. The same may be said of that form of tuberculosis which is known as scrofula, and which might be considered almost exclusively a disease of children. The scrofulous child is usually pale, with flabby skin and muscles. The glands around the neck are swollen, and skin disease, sore eyes, and running ears are frequent symptoms. The little patient usually manifests a phlegmatic condition, but we may also find some that are nervous and irritable. The latter often have a particularly white, delicate skin, which makes the veins visible. Fever may be observed in some children. In view of the happily very curable nature of scrofulous affections, the importance of the early recognition and of the timely and judicious treatment is, of course, self-evident.

CHAPTER XX

How can Infants and Small Children be Protected from Contracting Scrofula and other Forms of Tuberculosis?

Hereditary Causes of Scrofula.

A predisposition to scrofula which, as has been said before, is only a milder type of tuberculosis, may be either inherited or acquired. The hereditary type comes from parents who are scrofulous, tuberculous, or syphilitic. It has also been proved that when one or both of the parents were alcoholics, that is to say, addicted to the chronic abuse of intoxicants, their offspring has become scrofulous.

All this shows how dangerous it is for weakly and sickly persons, or those afflicted with any of the above enumerated diseases, to marry and have children before being completely restored to health. We wish to state again that all these diseases can be cured by timely medical treatment. To be cured from alcoholism the physician's help is not always necessary; in most cases it requires only the earnest and honest endeavor to abstain.

Acquired Causes of Scrofula.

The causes of acquired scrofula in children are to be sought in unhygienic environments and conditions, such as unhealthy dwellings, damp, crowded, unclean, and badly ventilated rooms, much indoor life, child-labor, underfeeding, exposure, and colds brought about by insufficient clothing and lack of care. In fact, one may say the same conditions which produce favorable soil for the invasion of the germs of consumption in the adult are conducive to the development of scrofula in children. How these conditions are to be overcome we have endeavored to explain in Chapters XII., XIII., and XIV., and we will speak of them in their sociological aspect in Chapter XXVII.

On page 37 we stated that it is extremely rare for tuberculosis to be directly transmitted, and that in children the contagion nearly always takes place while they are very young. We will now explain the various ways in which a healthy child may become tuberculous, and learn therefrom how to protect it from the danger of getting the disease, either by inhalation, ingestion, or inoculation.

The most common modes of infection during early childhood are perhaps the following: The consumptive mother

carries the child in her arms and if she coughs over it, the little drops of infectious saliva reach the baby's mouth or nose; or she caresses the child and kisses it on the mouth. In preparing the food, she tastes it to judge its temperature and flavor through the same rubber nipple or with the same spoon with which she feeds the child, and thus unconsciously conveys the germs of her disease from her own mouth to that of the infant. Later on the child will play on the floor of the room, and should there be a consumptive in the family who from carelessness or ignorance is not prudent in the disposal of his expectoration, the child is indeed likely to be infected. The little one, while playing on the floor, may with great facility inhale the bacilli floating with the dust in the air, and can thus acquire tuberculosis by inhalation, the full development of which may only take place in later years, when the origin will not be thought of. Again, the little child touches everything it can take hold of, infecting its fingers thoroughly, and by putting them in its mouth tuberculosis by ingestion may result and gradually develop into consumption of the bowels. Lastly, should the child's nails be neglected, it may scratch itself with the infected fingers, and thus inoculate its system with the disease. Tuberculosis of the skin, or lupus, may result from such an unfortunate accident.

Tuberculous Infection During Early Childhood.

To prevent these infections during childhood is certainly possible by taking the following precautions: Not only should consumptives be religiously careful with their expectoration, but they should associate as little as possible with young children, and stay away from playrooms and playgrounds. We repeat that to kiss children on the mouth should never be allowed, and the little ones should be taught never to kiss nor be kissed by strangers. They should be kissed by their own friends and relatives as little as possible, and then only on the cheeks. The floor on which the child plays should be kept scrupulously clean. There should be no fixed carpets in such a place, for they only serve as dust and dirt collectors and not infrequently harbor the germs of contagious diseases. The hands and nails of little children should be kept as clean as possible.

Kissing Unsanitary.

Expectorating on playgrounds should be considered a grave offence, and should be punished accordingly. These playgrounds should be kept clean, as free from dust as possible, and daily strewn with clean sand or gravel.

Clean Playgrounds.

Regarding protection from tuberculous milk we have spoken in Chapter VII.

CHAPTER XXI

How can Proper School Hygiene Become a Factor in the Prevention of Tuberculosis?

The school board, or board of education as it is called in some localities, in choosing a site for a school should bear in mind that the most suitable locality is a somewhat elevated region, where the streets are wide and the surrounding houses not too high and not too close together, and where the traffic is not too heavy. About the construction of a modern and model schoolhouse much could be said. The essentials of such construction are well known to all sanitarians and up-to-date architects, still in the interest of the cause I may be permitted to quote here a portion of a law which has recently been enacted in the Legislature of New York in reference to sanitation of schoolhouses. "No schoolhouse shall hereafter be erected in any city of the third class or in any incorporate village or school district of this State, and no addition to a school building in any such place shall hereafter be erected, the cost of which shall exceed five hundred dollars, until the plans and specifications for the same shall have been submitted to the commissioner of education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating, and lighting of such buildings. Such commissioners of education shall not approve any plans for the erection of any school building or addition thereto unless the same shall provide at least fifteen square feet of floor space and two hundred cubic feet of air space for each pupil to be accommodated in each study or recitation room therein, and no such plans shall be approved by him unless provision is made therein for assuring at least thirty cubic feet of pure air every minute per pupil, and the facilities for exhaustion of the foul or vitiated air therein shall be positive and independent of atmospheric changes. . . . All schoolhouses for which plans and detailed statements shall be filed and approved, as required by this act, shall have all halls, doors, stairways, seats, passageways, and aisles, and all lighting and heating appliances and apparatus, arranged to facilitate egress in case of fire or accident, and to afford the requisite and proper accommodations for public protection in such cases. All exit doors shall open outwardly and shall, if double doors be used, be fastened with movable bolts operated

Law in the State of New York Concerning Construction of Schoolhouses.

simultaneously by one handle from the inner face of the door. No staircase shall be constructed with winding steps in lieu of a platform, but shall be constructed with straight runs, changes in direction being made by platforms. No door shall open immediately upon a flight of stairs, but a landing at least the width of the door shall be provided between such stairs and such doorways."

In relation to the prevention of tuberculosis I would suggest only a few points. Where the site or locality does not permit of having a large playground, a roof-garden which can be covered in winter is absolutely necessary. Instead of our American windows, which can only be opened to one-half of their extent, I should wish to see French or casement windows in every schoolhouse, or windows sliding into the wall, or those that turn on a pivot, all of which permit twice the amount of foul air to go out and of good air to come in that our ordinary windows do. Heating and general ventilation of schoolrooms should, of course, be of the most approved kind. The walls and woodwork of schoolrooms should be plain, to make the accumulation of dust virtually impossible and the cleaning easy. All corners should be rounded off, and the walls painted with oil paint. The interior equipment—that is to say, the school furniture, benches, and desks—should be so arranged that they can easily be moved or folded together, so that a thorough cleaning of the floors is made possible after each daily session. It goes without saying that the drinking-cup should be replaced by the hygienic drinking-fountain, which makes the use of a cup unnecessary, and thus eliminates one method of transmission of microbic disease.

Playgrounds and Roof-gardens.

Internal Equipment of Schoolrooms.

Sanitary Drinking Fountains.

Every public school should have a well-equipped gymnasium, and a swimming-tank with constantly running fresh or salt water warmed to a suitable temperature in winter. Each pupil should be given the opportunity to bathe several times during the week. To learn to swim should be made obligatory, and every class should be supervised by a competent swimming master.

Gymnasium and Swimming Tank.

I am convinced that the public school which has a well-equipped swimming establishment and which makes regular bathing and instruction in swimming obligatory for every pupil will not only have fewer cases of infectious and contagious diseases, particularly scrofula and tuberculosis, but that the intellectual and moral status of its pupils will be higher.

The duties of the superintendent of a public school in the

prevention of tuberculosis are manifold. In arranging the curriculum he should bear in mind never to push the intellectual training to the detriment of the bodily development or physical welfare of the children in his school. There has been, and is yet, altogether too much overtaxing of the brain and the nervous system of our boys and girls in public and also in private schools.

Curriculum Should be Suited to Proper Mental and Physical Development.

The physician who has studied closely the beginning of tuberculous diseases knows that it is often at the period of entering puberty that the predisposed individual becomes most susceptible to the invasion of the bacillus, particularly when additional strain is put upon the physical or mental system. This holds good of both sexes. A judiciously divided curriculum, interspersed with gymnastics, swimming, and as much outdoor instruction as possible, would seem to me a most important factor in the prevention, not only of tuberculosis, but of all indoor diseases and nervous troubles.

Outdoor Instruction.

By outdoor instruction I mean not only botanizing tours and geological excursions, but also outdoor singing and outdoor recitation. I am convinced that outdoor singing and recitation, when the weather is neither too windy nor too cold, are most excellent means to prevent the development of pulmonary diseases. Breathing exercises, such as are described in Chapter XII. of this book, should of course be instituted, at least for a few minutes at a time, every hour or two. The lessons in physiology and hygiene at school must be adapted to the age and understanding of the pupils. The teacher should be familiar with all the practical and feasible methods in vogue in regard to the prevention of tuberculosis as an infectious and communicable disease. The source of infection from indiscriminate expectoration, from coughing and sneezing in people's faces, from kissing on the mouth, and other unhygienic habits can be taught in simple words to the children of even the primary classes. A good method to impress these simple rules on school children, and thus prevent them from contracting tuberculosis during school life, is to have a printed leaflet given to each child. These leaflets should contain the do's and don'ts which are the alphabet in the prevention of tuberculosis in kindergartens, private and public schools, and colleges. For this purpose I have compiled the following:

Simple Rules for School Children to Prevent Tuberculosis

Every child and grown person can help to fight consumption. School children can help by obeying the following rules:

Do not spit except in a spittoon, a piece of cloth, or a handkerchief used for that purpose alone. On your return home have the cloth burned by your mother, or the handkerchief put in water until ready for the wash.

Never spit on a slate, floor, playground, or sidewalk.

Do not put your fingers into your mouth.

Do not pick your nose or wipe it on your hand or sleeve.

Do not wet your fingers in your mouth when turning the leaves of books.

Do not put pencils in your mouth or wet them with your lips.

Do not hold money in your mouth.

Do not put pins in your mouth.

Do not put anything in your mouth except food and drink.

Do not swap apple cores, candy, chewing gum, half-eaten food, whistles, bean-blowers, or anything that is put in the mouth.

Peel or wash your fruit before eating it.

Never sneeze or cough in a person's face. Turn your face to one side or hold a handkerchief before your mouth.

Keep your face, hands, and finger-nails clean. Wash your hands with soap and water before each meal.

When you don't feel well, have cut yourself, or have been hurt by others, do not be afraid to report to the teacher.

Keep yourself just as clean at home as you do at school.

Clean your teeth with toothbrush and water, if possible, after each meal; but at least on getting up in the morning and on going to bed at night.

Do not kiss any one on the mouth or allow anybody to do so to you.

Learn to love fresh air, and learn to breathe deeply and do it often.

To help the memory of young children I have written the following somewhat more lengthy and systematic "Alphabet":

A is for Anybody who can help to prevent consumption,
a child just as well as a grown person.

B is for Breathing which you should learn to do deeply.
Take deep breaths in fresh air often.

The A.B.C. for Children in the Prevention of Tuberculosis.

C is for Coughing which you should never do in anyone's face, nor should you sneeze in any one's face. Turn away your head and hold your hand before your mouth.

D is for Don't. Don't swap apple cores, candy, chewing-gum, half-eaten food, whistles, bean-blowers, or anything you put in your mouth.

E is for Eating no fruit that has not been washed or peeled, or anything that is not clean.

F is for Fingers which should not be put in the mouth nor wet to turn the pages of books.

G is for Giving good example to your fellow-pupils and playmates by being always neat and clean, just as much so at home as at school.

H is for Handkerchief which should be used only to wipe your nose, and not your slate, desk, or shoes.

I is for Illness of other kinds besides consumption, which obeying these rules will also help prevent, such as colds, measles, grippe, diphtheria, and pneumonia.

J is for Joints where children have tuberculosis more often than in their lungs.

K is for Keeping your finger-nails clean. A scratch from a dirty finger-nail may make a bad sore.

L is for Learning to love fresh air, and not for learning to smoke.

M is for Mouth which is meant to put food and drink into, and not for pins or money, or anything not good to eat.

N is for Nose which you never should pick nor wipe on your hand or sleeve.

O is for Outdoors where you should stay just as much as you can. Always play outdoors unless the weather is too stormy.

P is for Pencils which you should not wet in your mouth to make them write blacker.

Q is for Questions which you should ask the teacher if you don't understand all these rules.

R is for Roughness in play by which you may hurt yourself or your comrades. If you have cut yourself, have been hurt by others, or feel sick, don't fear to tell the teacher.

S is for Spitting which should never be done except in a spittoon, or a piece of cloth or handkerchief used for

that purpose alone. Never spit on a slate, on the floor, the playground, nor the sidewalk.

T is for Teeth which you should clean with toothbrush and water after each meal, or when you get up in the morning and before you go to bed at night.

U is for Unkind which you should never be to a consumptive.

V is for Vessels like drinking cups and glasses which should not be used by one child after another without being washed in clean water each time.

W is for Washing your hands with soap and water before each meal, even if it is only lunch.

X is for X-rays which sometimes help to discover consumption or other forms of tuberculosis.

Y is for You who should never kiss anybody on the mouth, nor allow them to do so to you.

Z is for Zeal in carrying out these rules.

These leaflets should be read at regular periods, say once a month, and explained and commented upon by the teacher. The children should be allowed to keep the leaflets and take them home to their parents.

In schools where slates and lead-pencils are given to the children and collected after school hours, these articles should be disinfected before they are again distributed to the pupils. Not only the spread of tuberculosis, but far more contagious diseases, such as measles, diphtheria, and scarlet fever, may be prevented among school children by this simple precaution. The custom in vogue in some schools of having every child use a suitable envelope, so as always to have the same pencil, while preferable to no precaution at all, is, in my opinion, not nearly so safe as a thorough disinfection.

Disinfection of Lead-pencils, etc.

On playgrounds and in corridors, elevated spittoons with automatic flushing devices and cover such as illustrated in Figs. 5 and 6, should be placed here and there to remind the old and young never to expectorate on the ground.

An important point in the prevention of the disease under consideration among school children is that the school teacher should be familiar with the objective signs and symptoms of tuberculosis and the characteristics of a person predisposed to consumption.

The symptoms have been described at length in the preceding chapters, XVIII. and XIX. The duties of the school physician should be a daily inspection of the children to avoid the

Duties of School Physician.

propagation of acute infectious diseases including bronchitis and grippe; the constant supervision of the sanitary condition of the school buildings; regular visits to the gymnasium and the swimming-school; and, lastly, the most important function of all, the periodical examination of the chests of all pupils, teachers, and employees of the school. The weeding out of all individuals that might constitute a source of infection, or those whose treatment becomes an imperative necessity, and the advice to be given to the parents of a tuberculous child, will make the school physician a most important factor in the solution of the tuberculosis problem.

In the prevention of tuberculosis in childhood I have always looked upon the suppression of child-labor as one of the *prima-facie* necessities. While it is with a sense of deep humiliation that we must acknowledge that this curse to childhood is not yet entirely done away with in all our States, it is gratifying to note the ever-increasing progress toward its suppression.

Child-labor at Home is as Pernicious as that in Factories.

However, there is one kind of child-labor which the law can only reach with difficulty, unless it has the co-operation of the school teacher and the school physician. I refer to those cases where cruel or thoughtless parents impose upon their often delicate children the fulfilment of household duties or the performance of manual labor which would task the strength of a grown person. The timid child will probably never complain; but when the teacher or school physician suspects that the paleness, the stooping shoulders, and the tired, sad look are the results of excessive manual labors imposed upon the child by parents or guardians, it is his duty to investigate and interfere.

Luncheon for Poor School Children.

In schools located in the districts of the poor where underfeeding of the pupils not only often hinders the child from doing good school work, but actually predisposes to tuberculosis, I would suggest to the board of education a philanthropical enterprise in which the generous, good-hearted people of every community should gladly join. This is to provide these half-starved little ones with a luncheon of one or two meat sandwiches and one or two glasses of good milk. I am convinced that fewer will develop tuberculosis and scrofulosis and they will do better work at school and at home.

To avoid a pauperizing tendency, a few pennies may be charged for these lunches.

CHAPTER XXII

Can Tuberculosis be Cured?

This question can be answered with a very decided Yes. Of eminent men of the past and present, who in their youth or early manhood were declared to be consumptive, but who attained, nevertheless, a more or less advanced age, may be mentioned the German poet Goethe, Napoleon the First, and our own Peter Cooper. Dr. Hermann Brehmer, one of the foremost German physicians, was a consumptive when he started the first sanatorium for tuberculous patients in 1859, over which he presided for more than thirty years with great success. His most celebrated pupil, Dr. Dettweiler, entered his sanatorium as a consumptive, became Brehmer's assistant, and was until his death active as the medical director of the Falkenstein Sanatorium. The late Dr. Péan, of Paris, who died at the age of sixty-five, was declared phthisical when twenty. Francois Coppée, one of the greatest poets of modern France, takes delight in telling that more than twenty years ago a life insurance company refused to insure him, because he was declared consumptive, and how badly the company ought to feel now, having lost his premiums for over twenty years! And last but not least we must mention our own great Dr. E. L. Trudeau, the founder of the Adirondack Cottage Sanatorium, which recently celebrated the twenty-fifth anniversary of its most remarkable and brilliant life-saving career. There are thousands of cases where people, once declared consumptive by competent physicians, have ultimately recovered, and pursued their vocations in life with unimpaired vigor for many years afterward.

Celebrated Men Who were Cured of Consumption.

The statistics from sanatoria for consumptives, where patients in all stages of the disease are received, show that twenty-five per cent leave as absolutely cured, and forty to fifty per cent leave much improved, many of them being again capable of earning their living. In institutions where only patients in the early stages of the disease are received, as many as seventy to seventy-five per cent have been cured.

Results Obtained in Sanatoria.

Besides pulmonary tuberculosis, other forms are also curable, particularly the forms which manifest themselves as scrofula, or diseases of the bones or joints in children. The results which

Other Forms of Tuberculosis Also Curable.

have been obtained in sea-coast sanatoria and special hospitals, of which a number exist in France, Germany, Holland, and Italy, are well-nigh surprising. According to a recent report of the general secretary of the Society for the Creation of Sea-Coast Sanatoria for Scrofulous and Tuberculous Children in Germany, no less than fifty per cent of these little ones leave those institutions perfectly cured. Equally encouraging are

FIG. 40.—Children Afflicted with Tuberculous Bone or Joint Diseases at Play in Midwinter at the Sea Breeze Sanatorium, Coney Island, N. Y.

the reports published concerning our own Sea Breeze Sanatorium at Coney Island, N. Y. (Fig. 40).

We do not think it an exaggeration to say that of all chronic diseases tuberculosis is the most curable, and of late years the most frequently cured. After these glad tidings concerning the curability of tuberculosis in general, and particularly of the once so very much feared tuberculosis of the lungs or consumption, let us ask how these cures are obtained and if they are lasting.

CHAPTER XXIII

Have the Former Patients Who Left Sanatoria or Special Institutions for the Treatment of Consumption as cured, Remained Lastingly So?

That a lasting cure of consumption is possible we have shown in the preceding chapter by enumerating the names of some great men who were consumptive in their youth, and who were cured and lived a long and useful life, some even attaining a ripe old age.

Reports from Dettweiler, Wolff, Hauffe, Von Ruck, and Baldwin.

Concerning the duration of cures accomplished in sanatoria and special hospitals for consumptives, we will reproduce some of the statistics published in recent years. Among 99 patients discharged from the Falkenstein Sanatorium as cured, 72 were well at the time the inquiry was made, which was three to nine years after the patients had left the sanatorium. In 15 cases a relapse had occurred, but 12 of these patients had improved again; 12 of the 99 had died. Dr. Wolff's inquiries concerning 95 patients discharged as cured from Brehmer's institution in Goerbersdorf, resulted in the following: 5 were alive and well after a period of from 21 to 29 years; 52 were well after a period of from 12 to 21 years; and 38 were well after a period of from 7 to 12 years. Dr. Hauffe, of the St. Blasien Sanatorium in Germany, wrote to 324 former patients who had left the institution during the past ten years. Forty-six did not reply, 5 were reported dead, 12 had grown worse, 201 thought themselves still relatively cured, and 72 were absolutely cured. Dr. von Ruck, of Asheville, N. C., reported to the author of this essay that he had written to 650 of his former patients who had left the sanatorium from one to three years before; 457 responded, directly or through friends. Of these, 67 felt absolutely cured; 70 felt relatively cured; 258 felt still improved; 62 got worse or had died. Dr. E. R. Baldwin, of Saranac Lake, N. Y., reported recently that at the Adirondack Cottage Sanatorium they were in constant correspondence with 115 patients who had been discharged within the last ten or twelve years, and while a few had relapsed slightly, the majority were well at their homes. Of course, these reports do not, and cannot, correspond exactly. With the exception of the last-named institution (Adirondack Cottage Sanatorium), which only takes patients in the earlier stages, those sanatoria receive patients

for treatment in all stages of the disease. But, as a whole, these statistics are certainly encouraging, and the question "Can consumption be lastingly cured?" may also be answered with a decided Yes.

Pathological Proofs of the Curability of Consumption.

Not only the living but even the dead give us absolute proof of the curability of tuberculosis of the lungs. In the autopsies (post-mortem examinations) of many individuals who have died of other diseases than consumption, healed scars are found in the lungs, giving the visible evidence of a cured tuberculosis. Statistics concerning this occurrence show that the number of cases of healed tuberculosis of the lungs, discovered at autopsies, is nearly twenty-five per cent.

CHAPTER XXIV

What are the Modern Methods to Treat and Cure Consumption?

Consumption is not cured by quacks, by patent medicines, nostrums, or other secret remedies, but solely and exclusively by scientific and judicious use of fresh air, sunshine, water, abundant and good food (milk, eggs, meat, vegetables, fruit), and the help of certain medicinal substances when the just-mentioned hygienic and dietetic means do not suffice in themselves to combat the disease.

The thorough and constant supervision of the pulmonary invalid, the immediate intervention when new symptoms manifest themselves or old ones become aggravated or do not disappear rapidly enough, the prescribing of proper food and drink, can only be done by the thoroughly trained physician. Therefore, right here let us sound a note of warning; namely, that not the most beautiful climate nor the most delightful resort can cure the consumptive patient if he is not wisely guided in his treatment.

Strict Medical Supervision Essential to Cure.

Sometimes this class of patients think that they feel well enough to no longer need to submit themselves to the control of their physician. They think that they may safely pursue pleasures, sometimes even excesses, or take up work just as well as healthy people. Such carelessness on the part of a recovering consumptive has many a time resulted in a serious relapse.

The thorough belief in the curability of pulmonary tuberculosis, and the conviction that the hygienic and dietetic treat-

ment under constant medical supervision could be most successfully carried out in an institution exclusively intended for that purpose, caused Hermann Brehmer, the German physician mentioned above among the illustrious men cured of consumption, to establish the first sanatorium for consumptives, at Goerbersdorf in Silesia (1859); although it must be said, in justice to the English medical world, that Dr. George Bodington of Sutton Coldfield, Warwickshire, England, was the originator of the sanatorium idea, and that special hospitals for consumptives were erected in England, in or near large cities, as far back as sixty years ago. These "special hospitals" for consumptives in former years did not differ much from general ones, while a sanatorium for consumptives has many features by which it differs entirely from a hospital. Brehmer, in his day, maintained that such institutions should have particular climatic conditions, and should always be situated at a considerable elevation above the sea in order to obtain satisfactory results. The experience of more recent years, in Europe as well as in the United States, has, however, shown that properly conducted sanatoria or modern special hospitals, erected in regions with no claims for special climatic advantages, obtained just as good results in the end as institutions situated in typical climatic resorts.

Special Climatic Advantages Not Essential to Cure.

To give the layman an idea of what is understood to-day by a closed institution or sanatorium, exclusively intended for the treatment of consumptives, we will answer the following questions.

CHAPTER XXV

What is a Modern Sanatorium for Consumptives? And can Such a Sanatorium Become a Danger to the Neighborhood?

A modern sanatorium * for the treatment of consumptives is an institution usually situated in a healthful locality, somewhat

* The word sanatorium is used in this essay in preference to the word "sanitarium" for the following reasons: Brehmer, the founder of the first institution of that kind, called it "Heilanstalt," which means a healing institution; and the word "sanatorium," from the Latin *sanare*, to heal, gives certainly a better equivalent to the German word than the word "sanitarium." This latter word is derived from the Latin *sanitas*, health, and is usually employed in this country to designate a place considered as especially healthful, a favorite resort for convalescent patients, or an institution for the treatment of mental or nervous diseases.

elevated, relatively free from dust and traffic. Only patients suffering from tuberculosis are received. The greatest care is exercised everywhere, in buildings and surroundings, to avoid the possible transmission of the disease to employees, visitors, or the neighbors of the institution, and equally great care is exercised to prevent a reinfection of the patients themselves. All the precautions enumerated in Chapters IV. and V., which provide for the proper disposal and destruction of the infectious expectoration, are carried out with the utmost rigor in the sanatorium. A voluntary violation of rules, relating to the disposal of the expectoration, is followed by immediate dismissal of the offender.

Hygiene in the Sanatorium.

The hygienic and preventive measures in these modern sanatoria are so thorough that it may be said one is in less danger of becoming infected with the germs of consumption there than anywhere else. It is of the rarest occurrence that any of the physicians, nurses, or employees in such an institution contract tuberculosis. It seems to us that this is a very good proof of how easily infection can be avoided when physician and patient work together to combat the tubercle bacillus, this great foe of mankind.

Another very interesting observation is that in localities where sanatoria for consumptives are situated, the mortality from consumption among the inhabitants of the respective villages has markedly decreased since the establishment of the institution. The splendid hygienic and preventive measures instituted in the sanatoria have been voluntarily or unconsciously imitated by the villagers, and as a result the mortality from pulmonary tuberculosis among the inhabitants has gradually decreased. Thus we are glad to be able to answer in the negative the question so important in the combat of tuberculosis as a disease of the masses, "Are sanatoria for consumptives a danger to the neighborhood?" From well-conducted sanatoria for consumptives no danger can arise to the surroundings.

Mortality Statistics of Goerbersdorf and Falkenstein.

The statistics of the villages of Goerbersdorf and Falkenstein, where five of the largest German sanatoria have been located for many years, show that the mortality from tuberculosis has been reduced one-third from what it was before the establishment of these institutions.

In Rutland, Mass., where the Massachusetts State Sanatorium is located, during the six years after the opening of the sanatorium, there have been only eight deaths from tuberculosis annually, with an increased population; while prior to

the establishment of the sanatorium, among a smaller number of people, they had fourteen deaths annually from this disease. Almost as marked a reduction has been reported by Dr. Elliott of Gravenhurst, Canada, where sanatoria for early

Fig. 41.—Outdoor Sleeping in Midwinter on the Veranda of the Infirmary of the Adirondack Cottage Sanatorium at Trudeau, N. Y.

as well as advanced cases of tuberculosis have been established for nearly ten years.

The patients in such a sanatorium live, so to speak, day and night in the open air. During the day they lie on lounging chairs on the open verandas, take the rest-cure, or take walking or breathing exercises as prescribed. At night they sleep either on the veranda or with the windows wide open in their

bedrooms, often even in the coldest weather. It is surprising how easily consumptives get accustomed to the prolonged sojourn in the open air, or to sleeping at night on the open porches. Neither change of weather, cold, rain, snow, nor even wind, providing it is not too strong, hinders the patients from spending most of their time on the piazza, porch, or rest-cure gallery. Observations made by the house physicians in sanatoria prove that the change of weather has little influence on the trained consumptive patient, and that the rest-cure on the

Fig. 42.—Rest-cure in Midwinter at the Massachusetts State Sanatorium Located at Rutland, Mass.

galleries of the sanatorium can be successfully carried out in winter or summer, rain or shine.

Of course, patients are always protected by clothing or screens against becoming wet or chilled. Such open-air treatment in a sanatorium is watched or supervised by the physician. Concerning the endurance of outdoor life by consumptives, particularly outdoor sleeping in winter, Dr. Lawrason Brown, of the Adirondack Cottage Sanatorium, kindly sent me the following report: "About sixty to seventy-five per cent of all of our patients sleep out and more would do so but they have not the opportunity. More, of course, sleep out in the summer

than in the winter, but the figures I have given you pertain to the winter. No difference is made about the degrees of temperature. The coldest that we have had here this winter is 28° F. and 30° F. below zero. The patients have slept out right through it, though some have been uncomfortable until they have taken the necessary precautions. I do believe that when the thermometer falls much below zero, say over 15° F. to 20° F., very special precautions have to be taken in order to be comfortable in bed."

Dr. Herbert M. King, of the Loomis Sanatorium, gave me

Fig. 43.—Patients at the Loomis Sanatorium Exercising Just Sufficiently to Help Along the Cure.

the following report: "In the sanatorium proper, where both early and more advanced stages are received, fifty per cent sleep outdoors during the winter; and in the annex where, as far as possible, only the incipient and early stages are admitted, 100 per cent sleep outdoors. All patients who sleep on the veranda manage to be outdoors during the day-time, so that they average twenty-two hours of outdoor life out of the twenty-four."

In the New York State Sanatorium the patients do not sleep outdoors, but in rooms with windows wide open, and this

has been done when the temperature was down as far as 38° below zero. In the Massachusetts State Sanatorium (Fig. 42), which is situated at the top of a hill, the majority of the patients sleep in the wards, where there is a strong sweep of wind from whatever direction it may happen to come. It is just about the same as if the patients slept out of doors all the time while in these wards with open windows. In the Seabreeze Sanatorium for tuberculous and scrofulous children at Coney Island, outdoor sleeping, but above all, outdoor playing in mid-winter, is the rule; indoor life the exception. See Fig. 40.

I give here a few illustrations of sanatoria to show the life in those institutions. (Figs. 42 and 43.) As a contrast to the winter scenes, I also show a picture of the rest-cure in the woods adjoining a German sanatorium. (Fig. 44.) The latter shows how the patients in a sanatorium know how to have a good time. One must not think these institutions dreary and cheerless places. The majority of the patients do well, as a rule, and progress favorably toward recovery. As a consequence they feel happy and impart their joy and good humor to the rest, thus helping to keep all the patients in good cheer.

Discipline.

The discipline in these institutions deserves by no means to be considered an objectionable feature. Discipline in a sanatorium for consumptives is as essential in the interest of the patient as for everybody else. The rules and regulations of the institution are for the common good. The physicians and nurses have, as a rule, the patience, forbearance, and devotion which their calling requires; but when it is necessary in the interest of the patients and their environments, the physician must have the right to make his authority felt. A sanatorium should not only be a place where a patient becomes cured, but also a place where he should learn some lessons for the future. All that he will have learned from the rules and regulations, and the advice of the physician concerning how to protect himself and others from contracting the disease, how not to take cold, and how not to lose what he has gained, are precious lessons which he will take home with him.

The physician of the consumptive, whether in a sanatorium or at home, must be the friend of the patient, and have his unlimited confidence. In all such questions as marriage, sexual relations, and childbirth the physician's advice should be sought. Much unhappiness and family misfortune can often be avoided by asking and conscientiously following the physician's advice. One of the main features of sanatorium treat-

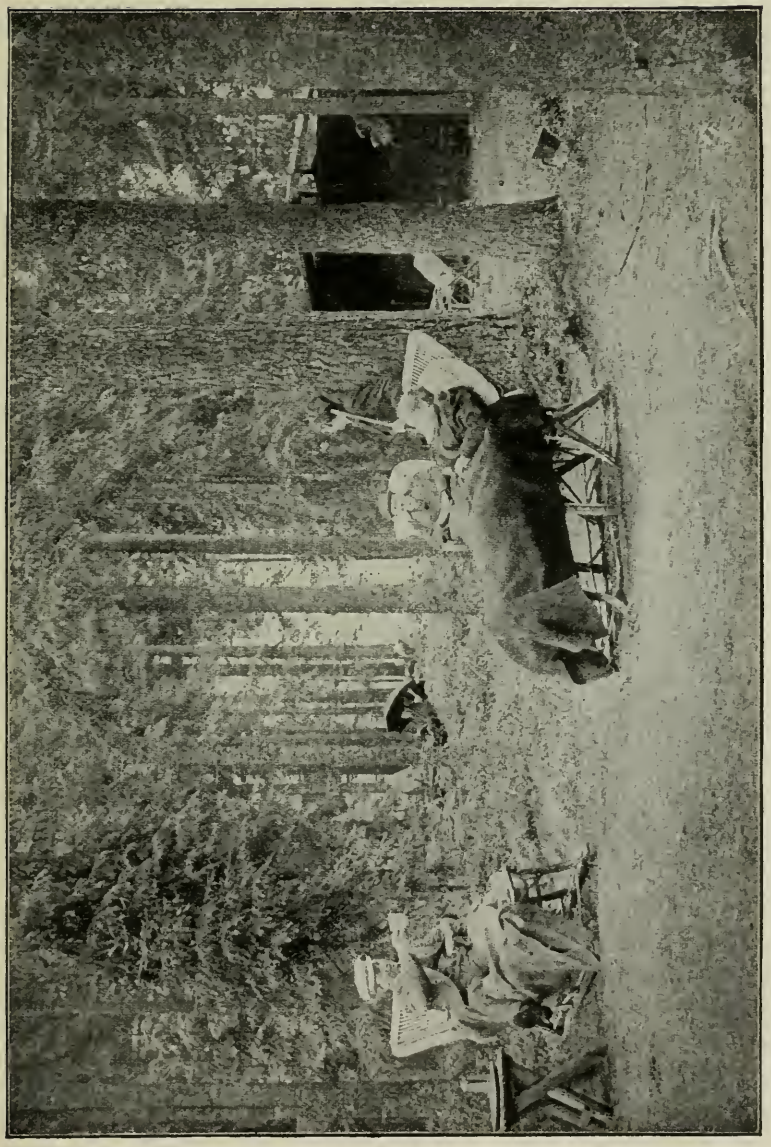

Fig. 44.—Rest-cure in the Woods. At the Reiboldsgrun Sanatorium (Germany).

Relation of Patient and Physician.

ment is ample nutrition. The principal meals are usually taken in well-ventilated dining-rooms, the lunches on the piazzas or on the rest-cure galleries. Many patients, in order that they may gain more rapidly in weight and strength, receive an additional quantity of fresh milk and eggs daily.

On arriving at the institution every patient is carefully examined and weighed by the physician, and this process is repeated at regular intervals during the entire stay of the patient at the sanatorium. The physician in charge or one of his assistants keep regular office hours for the convenience of the patients. Those who are unable to be up are visited twice a day by one of the physicians of the institution. Specially constructed rooms for the application of cold water, one of the means of treatment, are usually located in the basement, or the apparatus is installed in a neighboring building. A pharmacy, a laboratory, and a room for the treatment of throat diseases usually completes the equipment of a large sanatorium.

CHAPTER XXVI

What are the Duties of Modern Municipal Authorities in the Prevention of Tuberculosis?

To begin with the air, the thing most important to our existence, it would seem that it should be the ambition of our city fathers to have the city air as free from smoke as possible. That the smoke nuisance can be lessened in any city has been amply shown in this country as well as in England. It would seem from the recent literature I have been able to peruse, that the smoke nuisance can be solved by the installation of a device known as the Bunsen smokeless furnace, so named by its patentee, Mr. O. U. Bean, because it applies to steam boilers, the principle of the old Bunsen burner. The company controlling the device has adopted a novel method of exploitation. They install the "Bunsen" entirely at their own expense, protect their customers against fines for violation of the smoke ordinances of any city, however strict and rigidly enforced, and accept as remuneration an amount equal to the fuel saved their customers during a period of one year by reason of installation of the device.

Just as it is necessary to prevent the pollution of streams by forbidding factory refuse or sewage to be poured into them,

so should we endeavor to prevent dangerous and obnoxious gases emanating from factories, and smoking and odoriferous automobiles from polluting our atmosphere.

Obnoxious Gases and Fumes from Factories and Automobiles.

In some European cities the emission of smoke and gasoline fumes from motor vehicles is under police supervision, and its restriction must be a great comfort to pedestrians and persons in other vehicles alike.

Garbage and ashes should be collected in covered wagons. There are a number of devices now in vogue in European cities so arranged that no ashes whatsoever are blown into the street during the emptying of the receptacles.

It is better to clean the streets at night. It can be done more thoroughly then, with less interference with the traffic, and with less inconvenience to the people. It goes without saying that to sweep a street when it is dry and raise clouds of dust, should be considered a crime against one's fellowman.

What should be done to prevent possible tuberculous infection in public institutions and from tuberculous animals, we have already told in preceding chapters.

To prevent dust, and particularly infectious dust, also flies and other insects from settling on articles of food (fruit, candy, meat, etc.), there should be a city ordinance to make it obligatory to have all articles of food that have no natural covering protected by glass wherever they are put on sale.

CHAPTER XXVII

What Should School Authorities Do with the Child Predisposed to Scrofulosis or Tuberculosis and the One Which Has Already Contracted the Disease?

The tuberculous child whose presence in a public school may be a danger to his comrades, besides making his own recovery much more difficult, should not be allowed to remain in the general public school. Such a pupil should be placed, according to the degree of his disease, either in an open-air school or in a sanatorium to which is attached such a school for the education and development of the children. The accompanying picture (Fig. 45) shows an open-air school in Providence, R. I., and Fig. 46 illustrates what good use has been made of the old discarded ferryboat *Southfield*, anchored at the foot of East

26th St. It has been transformed into an open-air school for New York's tuberculous children.

How very prevalent these scrofulous and tuberculous diseases are among children, people in general have scarcely an idea. In Berlin, Germany, careful statistics are kept concerning the daily attendance of the children at the public schools. In one of them it was found that out of 125 boys and 132 girls who did not attend school regularly, not less than 114 of the former

Fig. 45.—By Removing a Part of the Brick Wall an Old Discarded Schoolhouse has been made an Ideal Open-air School. The First Established in the United States.

and 115 of the latter suffered from tuberculous or scrofulous troubles.

In New York, an examination of the children of tuberculous parents who frequented the dispensaries, revealed that 15 per cent had the seeds of tuberculosis in them, and suffered more or less from typical tuberculous symptoms.

CHAPTER XXVIII

Can the Treatment of Consumption be Carried Out with Satisfactory Results at the Home of the Patient?

This question, too, may be answered in the affirmative, for the cure of a consumptive patient is certainly also possible outside of a sanatorium. The conditions essential to success in such a case are that the social position of the patient and the

Fig. 46.—Open-Air School on the *Southfield*, a Discarded Ferryboat Anchored at Foot of East 26th Street, New York City.

general environments are such that all the hygienic and dietetic measures, so essential in the modern treatment of consumption, are at the disposal of the physician. The latter, however, though he may be well trained and exceedingly skilful, cannot hope for success unless the patient is obedient and willing to carry out every detail of the treatment.

We give here a number of illustrations (Figs. 47, 48) of how the patient in his own house may arrange for permanent open-air treatment at a comparatively small cost.

Sanatorium at Home.

In cities where the regulations of the Building and Fire Departments will not permit the construction of wooden sleeping porches, the problem is, of course, more difficult. Where one is so fortunate as to occupy his own house in city or town, or have an accommodating landlord, one may be able to have a fireproof outdoor sleeping device constructed. I am indebted to the Starnook Company for the construction of a device which is suitable for the rest-cure in the open air by day and for outdoor sleeping by night. As the thought of the latter use came first, it has been called the "Starnook." This name is very

Fig. 47.—A Cheap Temporary Porch Protected by an Awning and Supported by Braces set at an Angle. It can be built for $12 or $15. (From Carrington's "Direction for Sleeping in the Open Air.")

Description of the "Starnook."

appropriate, for, as will be seen from the description, on a clear night the stars can be seen from this little nook.

I have slept in my starnook since October, 1910, and never have I had more peaceful nights, more sound and refreshing sleep. To lie outstretched in the warm bed, breathing constantly the pure, fresh air, to be able to gaze at the beautiful sky, and watch the starry constellations without any effort, is a sensation which must be felt, for it cannot be described. I am inclined to believe that the most restless and nervous person will soon fall asleep in a quiet starnook. On bright, moonlight nights the scene is equally enchanting. Even on rainy

nights with roof overhead and the slats of the shutters open to admit air, the sensation is a cozy one. One soon gets accustomed to the rain pattering on the roof, and the monotonous noise is soothing.

My purpose in having this starnook constructed was that it might serve as a model for tuberculous, pneumonia, or nervous patients who have been directed to live and sleep in the open air. As will be seen in picture No. 49, my own starnook is built on an extension at the rear of the house, but it could also rest on posts or columns, or triangular supports attached to the

Fig. 48.—A Somewhat More Elaborate Porch for Sleeping and Living Out of Doors, which can be easily attached to the rear of any house.

walls. The starnook consists of three walls composed of frames holding movable slats, of a roof, and a floor. It is all made of galvanized iron with the exception of the floor, the window sash, and the roof-frame. The wall of the house closes the fourth side through which access is had to the starnook by a long window or a door. It is about 9 feet long, 6 feet deep, 6 feet high at the outer side, and 8 feet next to the house. It can also be made 8 feet deep and will then hold a bed and couch or two beds.

In either end is a glass window which can be opened outward, and Florentine glass fills the triangular spaces at each end under the slope of the roof, which rests a short distance above the walls to allow for free circulation of air at all times.

Fig. 49 shows the starnook arranged for use at night, or in rainy or stormy weather. Fig. 50 gives an interior view, all closed except the door leading from the house into the starnook. On a clear night when there is no fear of rain or snow, the roof of the starnook is raised by means of a crank and counterweights.

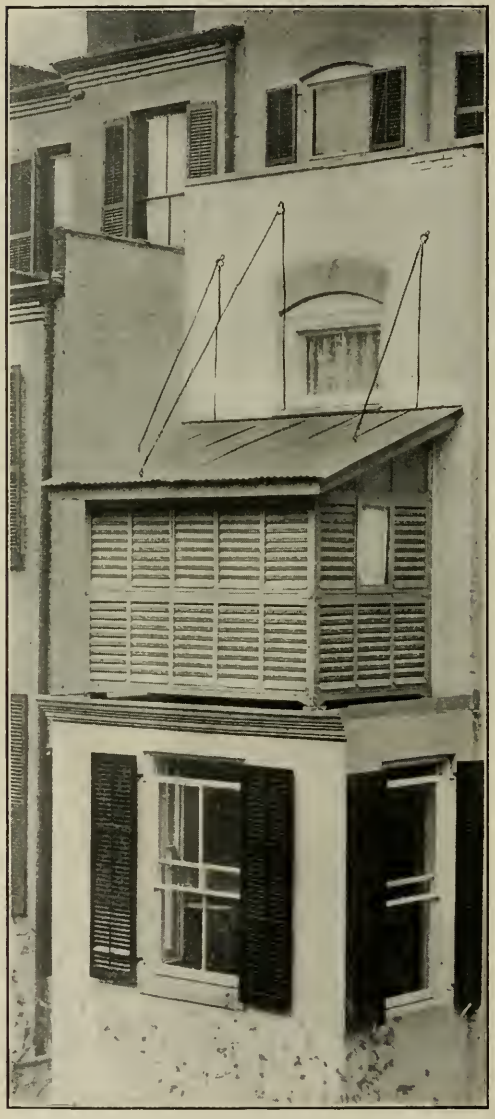

Fig. 49.—Starnook (Knopf Model) for the Rest-cure in the Open Air and for Outdoor Sleeping at Night.

As seen in Figs. 51 and 52, the roof can be completely raised against the wall of the house and an unobscured view of the sky can be had by the occupant of the bed. During the day the starnook can be transformed into a typical rest-cure veranda. Three upper sections of the front shutters can be entirely opened, and with the two windows open and the roof up, one is certainly out of doors. Fig. 51 shows the starnook transformed from a night shelter to a pleasant resting porch by daytime.

Fig. 52 gives an idea of the interior aspect of the starnook by day with roof and all windows open.

The advantages of this device are manifold. When painted to match the house it

forms an attractive addition. The slats that form the walls, instead of being straight, are bent inward at the lower edge and outward at the upper, in such a way that when partly open they permit a free access of air, yet neither the bed nor the occupant of the bed can be seen by neighbors, and absolute privacy is thus secured. (See Fig. 53.)

In very stormy weather the shutters can be tightly closed (Fig. 53A) to protect the occupant from rain, drifting snow and strong winds, and still there will be enough open spaces to allow the freest circulation of air. The lower sections of the shutters are manipulated simultaneously by means of a handle conveniently located so as to be reached from the bed. Each upper section has an individual handle whereby the slats can be placed at any angle desired. The handles are of wood so as not to chill the patient or occupant when he touches them in cold weather. An electric light which can be turned on and off with the aid of cords by the occupant of the bed, and a push button to call a maid or nurse in case of illness, complete the arrangement for comfort.

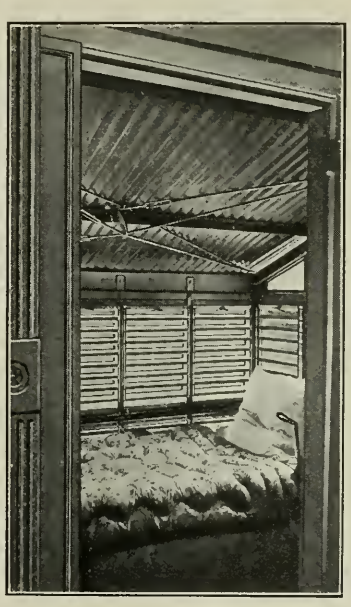

Fig. 50.—Interior of Starnook (Knopf Model) with Windows, Roof, and Shutters Closed. View from adjoining bathroom.

Sometimes the starnook cannot be constructed so that the roof can be raised upward to rest against the wall of the house. When this is the case the roof has to be tilted outward. When for one reason or other it is desirable to have the construction on the roof of the house, a starnook can be constructed with a little shack, the two joined together so that the latter can be heated when serving as a dressing room. To make a good support for the roof of the starnook when raised, the shack would have to be somewhat higher. Another way is to divide the roof into two sections so that they may better withstand strong winds when the roof is open. The same plan can, of course, also be carried out on the ground, in the yard or garden. If it is desired to have a double starnook,

two can be joined by a bathroom and a dressing room placed between them.

For the timid who are afraid of sudden rain showers or snowstorms and believe that they cannot get the roof down quickly enough, or who fear to get out of the warm bed for the purpose of lowering the roof, there can be arranged an electric motor manipulating the raising and lowering of the roof quickly and securely, operated by means of a push button within easy reach from the bed.

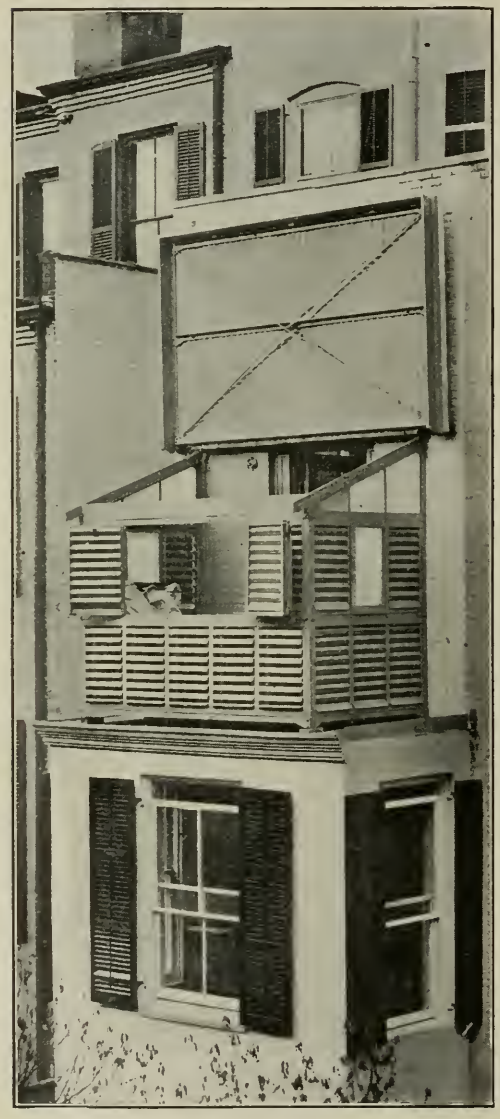

Fig. 51.—Starnook (Knopf Model) Transformed from Night Shelter to a Pleasant Resting Porch by Day.

For those who cannot have such arrangements, there are simple methods for carrying out the rest-cure in the open air by day. A large beach chair of wickerwork, such as is seen at our fashionable seaside resorts, is procured. After the seat has been removed the inner walls are lined with padding (Fig. 54). A reclining chair is placed with its back in the interior, and the whole arranged so that the patient is protected from the wind and sun. There the patient installs himself for the day.

with his books and writing materials placed beside him on a little table, on which his meals may also be served. Being light, the whole can be shifted whenever the wind changes, and according to the different time of day, so that the invalid's body may be bathed by the rays of the sun, while his head remains in the shade. A more simple arrangement, called a "half-tent," which I have devised for the same purpose, can be easily transported from place to place (Fig. 55).

Devices for the Rest Cure by Day.

Fig. 52.—Interior of Starnook (Knopf Model) with Windows, Roof, and Shutters Open. View from adjoining bathroom.

Poorer patients, who for financial reasons cannot have such conveniences and who cannot be received in a sanatorium, must be advised to ask the help of a physician, and under his guidance imitate as far as possible and practicable the sanatorium instalment and treatment at home. During the day the lounge or reclining chair should be moved near the open window if there is no porch or balcony. In summer, or on not too cold or windy days in winter, the patient may be placed, warmly wrapped, on his chair on the flat roof, protecting his head from the sun by an umbrella or a small, improvised tent. If there is a yard or garden, a small platform of boards may be arranged for the chair in a spot sheltered from the wind. A plain steamer chair, padded with a quilt or blanket, will answer the purpose just as well as a costly reclining chair.

Selection of Room for Tuberculous Patient.

On page 33, Chapter VI., we described how the consumptive's room should be arranged, and now we will give some suggestions in case the home treatment becomes necessary or desirable, and show how the sanatorium treatment can be imitated as nearly as possible. First, one should bear in mind that the sunniest, best-ventilated, and most comfortable room of the house, preferably on a higher floor, is the best suited for that purpose. All superfluous furniture, dust-catch-

ing curtains, and fixed carpets should be removed, but the room must not be made cheerless. A few rugs, washable curtains, some cheerful pictures may well be allowed. If the arrangements illustrated in the preceding pages for outdoor sleeping at night and the rest cure in the open air by day can be added, so much the better. This, however, will only be feasible in a few instances, and is not always practicable in large cities,

Description of Window-tent.

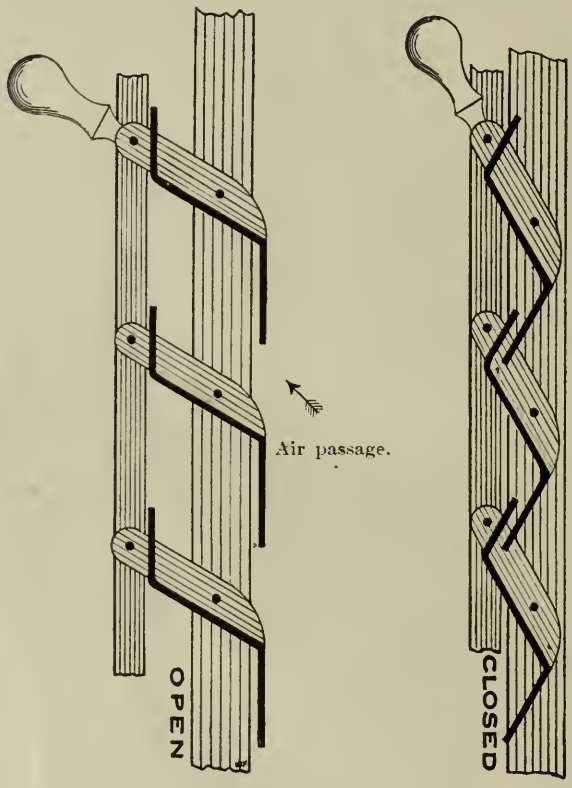

Fig. 53. Fig. 53A.

Fig. 53.—Diagram Showing the Mechanism of the Movable Iron Slats.

particularly in our apartment- and tenement-houses. To make the open-air treatment feasible by day and night even in the homes of the poor living in cities, I have devised what I call a "Window-Tent." It consists of an awning, which, instead of being placed outside of the window, is attached on the inside of the room. It is so constructed that the air from the room cannot enter or mix with the air in the tent. The patient lying in the bed, which is placed parallel with the win-

dow, has his head and shoulders resting in the tent (Fig. 56). By following the description (Fig. 57) closely it will be seen that the ventilation is as nearly perfect as can be produced with so simple a device. The tent is attached to the frame of an American window, but it does not quite fill the lower half. A space of about three inches is left for the escape of the warm air in the room. By lowering the window, this space can be reduced to one inch or less, according to need.

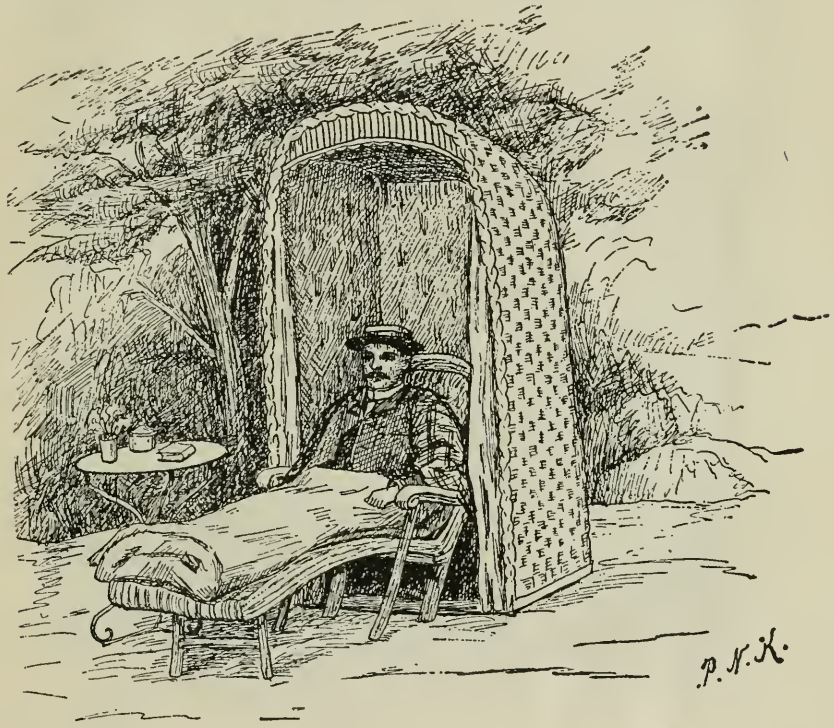

Fig. 54.—Beach Chair Arranged for the Open-air Rest-cure.

On extremely cold and windy nights there need not be left any open space at all above the tent frame. The patient's breath will rise to the top of the tent, the form of which aids in the ventilation. The tent is constructed of a series of four frames, made of Bessemer rod suitably formed and furnished with hinged terminals; the hinges operating on a stout hinge pin at each end with suitable circular washers interposed to insure independent and easy action in folding the same, the Bessemer rod being hardened to make a stiff, rigid frame to insure its maintaining the original form.

The frame is covered with extra thick yacht-sail twill, properly fitted, and having elongated ends to admit of their being tucked in under and around the bedding to prevent the cold air from entering the room. The patient enters the bed and then the tent is lowered over him, or with the aid of a cord and a little pulley attached to the upper portion of the window he can manipulate the lowering and raising of the tent himself. Shutters or Venetian blinds, whether they are attached on the inside or on the outside of the window, can be utilized in conjunction

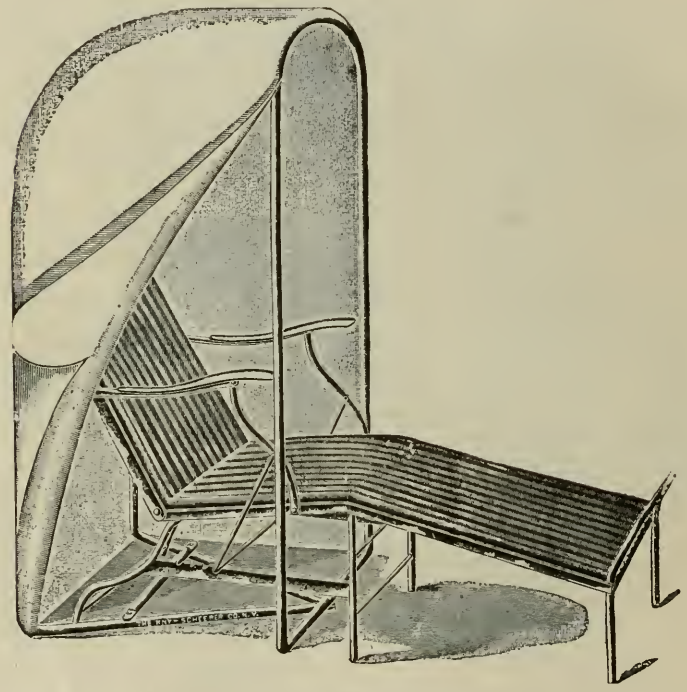

Fig. 55.—Dr. S. A. Knopf's Transportable Half-tent for the Rest-cure in the Open Air.

with the window-tent as a screen to intercept the gazes of the neighbors, and in stormy weather as a protection (Fig. 58). The bed can be placed by the window to suit the patient's preference for sleeping on his left or right side, so that he has the air most of the time in his face. Another advantage of the window-tent is that it will not attract attention from the outside. The bed being placed alongside of the window will be convenient for a majority of the poor who have small rooms. If, however, the bed must be placed at a right angle to the window, this can

be arranged as well. A piece of transparent celluloid is placed in the front of the tent to serve as an observation window for the nurse or members of the family to watch the patient if this is necessary. It also serves to make the patient feel less outdoors and more in contact with his family, as he can, if he desires to, see what is going on in the room. If the bed must be placed at a right angle to the window, the observation glass can be put in on either side. It goes without saying that, as a rule, patients should not smoke; when, in exceptional cases, this can be allowed, the danger of the celluloid window becom-

Fig. 56.—Dr. S. A. Knopf's Window-tent in Position, with Patient in Bed looking through the celluloid window into the room, but breathing outdoor air only.

ing ignited must be impressed upon them and the greatest caution urged. I prefer celluloid to glass because there is no danger of its breaking when the tent is raised and lowered.

Adjustment of Bedstead to Suitable Height.

If it is necessary to raise the bed to the height of the window sill, this can be done with little expense. If the bed is of iron, a few additional inches of iron piping can be attached to the legs by any plumber or one handy with tools; raising a wooden bed can be accomplished with equal facility. If the window-tent is to serve the patient only during the night, the tent can be pulled up (Fig. 59) and the bed moved away from the window

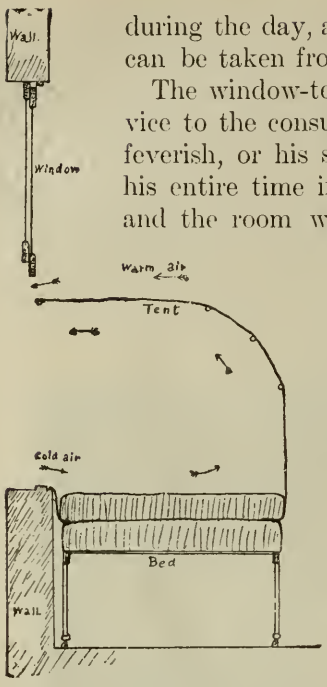

FIG. 57.—Diagram Showing Ventilation of Window-tent.

Advantages of the Window-tent in Winter.

during the day, and the window closed. Or the tent can be taken from the hooks and put out of the way.

The window-tent, of course, is of the greatest service to the consumptive sufferer in winter. If he is feverish, or his stay in bed is advisable, he can spend his entire time in the tent. If the people are poor, and the room where the consumptive sufferer lies serves as living-room for the rest of the family, the fact that the well members need not shiver while the patient takes his open-air treatment is of vital importance in many respects. While the room will not be quite as warm as if the window was entirely closed, it will be much warmer than if there was no tent in front of the window. Laying aside the economic advantages to a poor family when not obliged to heat more than one room, the patient feels that he does not deprive his loved ones of comfort and warmth and that he is less a burden and hindrance to their happiness. The other members of the family, on their side, feel that they can give the patient all the air he needs and that he need not suffer for their comfort.

Warm Covering But not too Heavy is Essential.

In winter the patient's bed must be covered with a sufficient number of blankets to assure his absolute comfort and warmth throughout the night. Still, the coverings should not be so heavy as to press down upon the body and make the patient feel uncomfortable or tire him. The tightly woven blanket is a better protection than the loosely woven one. To the poor, whose disposal of

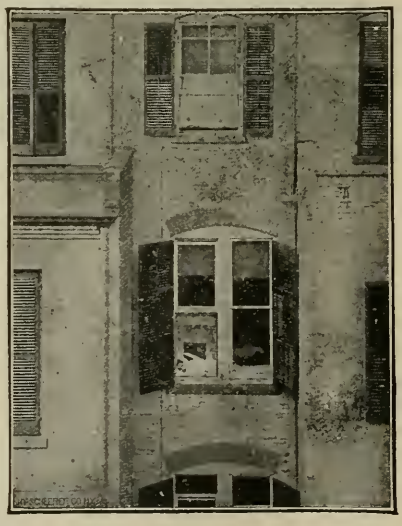

FIG. 58.—View of the Window-tent as Seen from the House Opposite.

blankets is, alas, often very limited, it may be good advice to tell them to put several layers of newspapers between the coverings. *Outdoor Life* of December, 1905, recommends to sew half a dozen layers of paper between two layers of flannel. This certainly will make a cheap, light, and warm covering. In extremely cold weather, the patient while sleeping in the

Fig. 59.—Dr. S. A. Knopf's Window-tent Raised when Not in Use.

window-tent, should wear a sweater and protect his head and ears with a woollen cap, shawl, or woollen helmet, such as is shown in Fig. 60.

Some patients will often complain that the bright light awakens them too early in the morning, and that they have difficulty in going to sleep again. In such instances I counsel the patient to have some light-weight but dark-colored material (such as a black lisle-thread hose) to put over his eyes. This usually suffices to obviate the inconvenience caused by the bright light.

It will be observed that by merely closing the window and raising the tent the patient finds himself in the warm room, ready for his toilet, sponge-bath, or massage as the case may be.

When there is no garden, veranda, or roof, the window-tent

How the Window-tent can be Utilized for the Rest-Cure on the Reclining Chair by Day.

can also be put into service for the rest-cure during the day. The bed is moved away, and the reclining chair put in its place. The latter can be raised to the necessary height by wooden blocks or a platform, and with the aid of blankets and comforters the air from the room can be excluded, and the patient, being in front of the open window, breathes only outdoor air. When beginning this aërotherapy, it is of course essential that it must be done gradually according to the susceptibility of the patient to the cold. It should, however, be impressed upon him that night air is as pure as day air. It is best to begin by placing him in the tent for a few hours at night, and a few hours during the day in the chair. The attending physician will regulate all this so as to get the patient gradually accustomed to live in the pure cold air day and night. A hot-water bottle for the feet either in bed or in the chair may often be necessary in extreme cold weather. The patient's feet must be kept warm if he is to benefit by the open-air-treatment.

Fig. 60.—Woollen Hood or Helmet for Out-door Sleeping in Cold Weather.

The hygienic precautions concerning the expectoration must, of course, be carried out in the private home as rigorously as in the institution. Thus, if the patient has an earnest determination to do his duty, confidence in his physician, and the good will of the friends and relatives who live with him, it is possible to make even a modest home temporarily suitable for the sanatorium treatment.

CHAPTER XXIX

What are Public, State, Municipal, or Private Sanatoria?

To enable the poorer classes to avail themselves of the advantages of institution treatment for consumptives, noble-minded men and women, philanthropists, statesmen, and physicians have in recent years been instrumental in creating in many parts of Europe and in the United States so-called State, country, or municipal sanatoria. All such institutions in the United States are establishments for the exclusive treatment

of patients suffering from pulmonary tuberculosis, created by the funds of the State or municipality, and supported entirely or in part by the State or municipality.

The first private institution for the consumptive poor and for those of moderate means was established 26 years ago by Dr. Edward L. Trudeau at Saranac Lake, N. Y. Thanks to Dr. Trudeau's untiring energy and the generosity of his friends, the little one-cottage sanatorium gradually grew into a small village, so that to-day no less than thirty-four cottages, an infirmary, a library, a laboratory, a reception building, and a church, are comprised in the Adirondack Cottage Sanatorium. Thousands of persons have passed through this

Fig. 61.—Panorama of Part of the Adirondack Cottage Sanatorium.

institution, most of whom have regained their health or have improved sufficiently to pursue their occupations with safety. Fig. 61 shows a group of cottages of this justly celebrated sanatorium. The first State sanatorium in America was erected near Rutland, Mass., in 1895 (Fig. 62). In this institution patients pay fifty cents per day. Since then many such institutions have been founded. There is now hardly a State in the Union which has not one or even several State sanatoria.

The public sanatoria in Germany have a somewhat different function. There, the moment an individual enters upon the career of an ordinary laborer, servant, or other calling in which he earns less than 1,900 marks per annum, he is obliged to be insured against sickness, accidents, and old age. His employer is as much responsible for the prompt paying of his premiums

Life Insurance.

as he is himself. If the insured develops tuberculosis he is immediately sent to one of the many sanatoria of that country. The directors, who are at the head of these state insurance companies, have long since learned that by timely treatment in a sanatorium the tuberculous invalid is most speedily and lastingly cured, and consequently with the least expense.

Some of these insurance companies send their consumptive policy-holders to existing private institutions, and pay for their maintenance and care, and some of the larger companies have found it to their advantage to erect special sanatoria of their own.

To discuss whether such state invalidity insurance companies are practicable or feasible in this country does not come within the scope of this work. Still less can we enter into a discussion of why private life insurance companies will not insure persons among whose near relatives consumption has

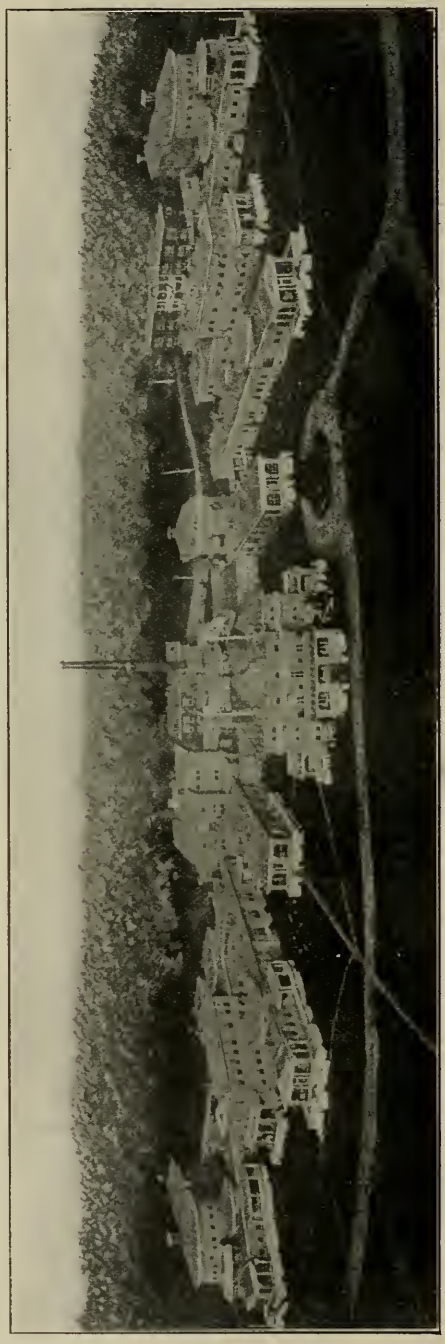

Fig. 62.—Model of Massachusetts State Sanatorium.

occurred, in spite of the evident curability of the disease. There seems now, however, to be a change of opinion on this subject, and there is hope that before many years insurance against tuberculosis will be possible in the United States.

Urgent Need of State and People's Sanatoria.

While it is most gratifying to note that some States have undertaken to care for their consumptive poor, and while noble men and women have privately undertaken to care for some of those unfortunate sufferers, there is yet a great deal to be done. In view of the great number of consumptives with little or no means in our thickly populated cities, it is evident that the existing institutions are like a "drop of relief in an ocean of woe." Thus let us hope that the good work will go on, and that the near future will see the multiple creation of public and private sanatoria and special tuberculosis hospitals in the United States.

That such special institutions and thorough hygienic measures are well calculated to combat tuberculosis as a disease of the masses, we shall try to prove in the following chapter.

CHAPTER XXX

What Evidence Exists That by Taking Care of Consumptives in Special Institutions and by Hygienic Measures, Tuberculosis as a Disease of the Masses can Really be Successfully Combated?

In England there have existed special institutions for the treatment of consumptives, that is to say, hospitals and seacoast sanatoria, in relatively large numbers for over fifty years. As a result of the maintenance of these institutions and the enforcement of a most excellent general public hygiene, it was possible to reduce the mortality from tuberculosis during the last years in a most surprising manner, and more rapidly than in any other country of the world. According to the following statistics, compiled by Dr. Tatham, the statistical superintendent in the registrar-general's office, the mortality from tuberculosis among the population of England and Wales has been reduced to wellnigh half of that which it was thirty years ago.

The death rate per million of the population of England and Wales from pulmonary tuberculosis was in—

1858–60	2,565.0	1881–85	1,830.4
1861–65	2,526.6	1886–90	1,635.4
1866–70	2,447.8	1891–95	1,462.2
1871–75	2,218.0	1896–1900	1,322.6
1876–80	2,039.8	1901–1905	1,215.2

In the United States, especially during the last ten years, through the working together of municipal prophylaxis and popular education, and through the establishment of sanatoria and special hospitals for the treatment of tuberculosis, the death rate has likewise diminished materially. Dr. Otis, in the chapter on "The Future Outlook," in his book "The Great White Plague," gives the following figures:

"In five Eastern States and ten cities of the United States, the mortality has been reduced from 27.2 per 10,000 in 1887 to 21.2 per 10,000 in 1900, a diminution of 18 per cent. In New York City the death rate from tuberculosis has diminished from 27.9 per 10,000 in 1900 to 22.9 in 1908, and during the ten-year period from 1892 to 1902 the death rate from consumption and tuberculous meningitis in children in New York has been diminished more than 40 per cent. In Massachusetts, where careful statistics have been kept for a long period, the diminution of deaths from consumption during fifty years ending in 1902 was 63 per cent; and from 1892 to 1902, a period of ten years, the diminution has been from 24.5 to 15.8, or a little over 35 per cent."

These figures are perhaps the best answer to the question asked at the head of this chapter.

CHAPTER XXXI

What can Philanthropists and Other Men and Women of Good Will Do to Help Combat Tuberculosis as a Disease of the Masses?

In Chapter XXV. we have spoken of the urgent need of sanatoria and special hospitals for the consumptive poor. These institutions are particularly wanted in large centres of population. In nearly all of our large cities there are thousands of poor consumptives living without care or treatment in their dark, filthy tenement-houses, and spreading their disease to their kin and neighbors. Perhaps not one of all the great cities of the Union at the present time can offer sufficient hospital

facilities for the treatment or isolation of these unfortunate people. A very large percentage of these patients could be cured or restored to health and made breadwinners of their families, if they were taken away from their unhygienic surroundings in time and received proper treatment in a sanatorium.

What great good may be done in this respect, how much misery and suffering it may alleviate, and how many lives it may thus save, needs hardly any further demonstration.

But, besides the sufferers from pulmonary tuberculosis, there is a large class of sufferers, especially among the children of the poorer classes, who are afflicted with other forms of tuberculous disease, particularly scrofula, and joint and bone tuberculosis.

We have already spoken on page 76 of the excellent results obtained in the treatment of tuberculous and scrofulous children in the sea-coast sanatoria of France, Germany, Holland, and Italy. The climate at the sea-shore, in addition to good nutrition and cold and warm sea-baths, seems to be particularly favorable for the cure of scrofula and tuberculosis in children. Institutions for this treatment, like sanatoria for consumptive adults, are important factors in combating tuberculosis as a disease of the masses. The creation of such institutions in our own country cannot be too warmly recommended to those who wish to help suffering little children.

The cure of tuberculosis in its various forms can be accomplished only by a thorough hygienic and dietetic treatment under strict medical supervision, in sanatoria or special hospitals, or, if circumstances permit, at the home of the patient.

The prevention of tuberculosis as a disease of the masses, on the other hand, especially in the form of pulmonary tuberculosis or consumption, must be sought in combating the causes. In ignorance, lack of light, air, and sun, unhealthy tenements, unclean linen, lack of proper or sufficient food, child-labor, overwork, excesses of all kinds, and, above all, in the abuse of alcoholic beverages, must we recognize to-day the most important factors in the propagation of the disease.

General Causes of Tuberculous Diseases.

To combat the ignorance in regard to hygienic modes of life in general and the hygiene of tuberculosis in particular, among the masses, must be the duty of the educated. Physicians, teachers, employers, and all men and women who have time, means, ability, and inclination, should unite to educate the masses by lectures and the distribution of pamphlets con-

cerning the nature of diseases, particularly tuberculosis. The formation of societies for the prevention of tuberculosis should be encouraged. It is gratifying to note that there exist now in nearly every State in the Union one or several societies for the prevention of tuberculosis, which are affiliated with the National Association for the Study and Prevention of Tuberculosis. The headquarters of this association are at 105 E. 22d St., New York City, the present Executive Secretary is Dr. Livingston Farrand. The state and municipal governments, boards of health, or other sanitary authorities should not only favor these useful enterprises, but gladly co-operate in order to increase their usefulness.

To give to the poor people of large cities more air, light, and sun, it is essential not only to provide for good sanitary dwellings, of which we shall speak in detail in the next chapter, but also to create, by public means or private philanthropy, a sufficient number of parks and playgrounds, particularly in the more densely populated districts. Such parks and breathing places are justly called the lungs of a great city.

Some Causes of Bad Nutrition.

The causes of insufficient and bad nutrition, while they often have to be sought in the economical and social condition of the community, which we cannot discuss here, are just as, and perhaps more, frequently to be found in ignorance and inexperience. To make a good, plain, healthy, and tasty meal with relatively little expense, is an art which must be taught to the young wife leaving the factory or the position in the store to enter upon the duties of a housewife. Here is a field for noble-minded and experienced women who have made the art of cooking a study. By imparting their experience to their less fortunate sisters, they will make a new household lastingly happy.

Of course, the establishment of public eating-houses, where especially the unmarried people of the working classes can obtain good and plain meals for a nominal price, is also a necessity. In connection with the subject of malnutrition, we wish to say one more word concerning poor school-children, especially in large cities. The majority of them very rarely go home for luncheon, and the provisions they bring from home are often of the most meagre kind. In some cities of Germany the experiment has been made to provide these poor children with a lunch of good meat sandwiches and a glass of milk. The result of this most praiseworthy work among children badly fed at home has been simply surprising. Nearly every one of

them gained in weight within a month's time, and all of them were certainly made happier and capable of doing better work at school.

Alcoholism and Tuberculosis.

Now one more word concerning alcoholism or drunkenness. There is no doubt that alcoholism must be considered the greatest enemy of the welfare of a nation, the most frequent destroyer of family happiness, the ruination of mind, body, and soul, and certainly the most active co-operator of the deadly tubercle bacillus or germ of tuberculosis (consumption).

To combat alcoholism (drunkenness or intemperance) requires above all education. Extreme measures and fanatical laws will do but little good. From early childhood the dangers of intemperance and its fearful consequences should be taught. In schools and at home the drunkard should be pictured as the most unhappy of all mortals. While the very moderate use of feebly alcoholic drinks, such as light beers, may be considered as harmless to adults when taken with their meals, alcohol should never be given to children even in the smallest quantities.

In families in which there is a fear of hereditary transmission of the desire for strong drink, even the mildest alcoholic drinks should be absolutely avoided. It would also be best if all people so predisposed, or who may have acquired only the occasional desire for drink, would never smoke, for experience has taught that attacks of dipsomania (periodical sprees) are often caused by an excessive use of tobacco. The young man starting out in life should take with him the moral training which will enable him to be a gentleman, and be considered a polite gentleman, though he absolutely refuse ever to enter a liquor saloon in order to treat or be treated to drink. It is this treating habit —alas! so prevalent in our American society—which has ruined many a young man and made him a moral and physical wreck. The creation of tea and coffee houses where warm, non-alcoholic drinks, including bouillon, are sold in winter, and cool ones in summer, are to be encouraged. It would be of additional advantage if some of these houses could also offer healthful amusements for old and young. Temperance societies, which through intelligent propaganda help to combat the fearful evil of alcoholism, should receive encouragement from everybody. Lastly, the philanthropists, city fathers, and statesmen should bear in mind that while it is true that alcoholism very often results in poverty, want, and misery, it is equally true that enforced idleness, poverty, and want lead not infrequently to

alcoholism. In a country as rich and as prosperous as ours, there should be employment for all those who wish to, and can work. The remuneration for labor should be large enough to enable an individual to live decently and save enough to insure himself against sickness, accident, and old age. The time must and will come when this insurance will have to be made obligatory upon every individual with a limited income.

CHAPTER XXXII

How Might the Tuberculosis Problem in the United States be Solved by Judicious Legislation and a Combination of Public and Private Philanthropy?

Presuming that there were in all the States sufficient regulations against the spread of tuberculosis from man to man, and that the laws against the propagation of tuberculosis by animals were uniform throughout the United States and enforced in the best possible manner, we would, for further work, suggest the following plan:

In a community, even of the smallest size, it should be borne in mind that tuberculosis is a disease of the masses, that it attacks people of all ages and in all climes, rich and poor alike. Even the smallest community should have its health officer whose duty it should be to see that every tuberculous patient is properly cared for. The physicians should co-operate with the health officer to this end. Every case of tuberculosis should be reported to the health officer, who in turn should be helpful to the physician by furnishing the examination of sputum, enforcing sanitary regulations, and disinfecting sick-rooms.

Tuberculosis Dispensaries.

Every large community should have a tuberculosis dispensary, or several of them, according to the size of the city. These dispensaries should serve as clearing houses. If the patient is well to do, and able to pay for a physician, he should be referred back to his family physician for treatment. If the patient is unable to pay he should be kept under observation in the dispensary until it can be determined whether he should be sent to a special hospital or a sanatorium, or allowed to remain at home.

The dispensaries should have district visiting nurses to visit the patients at home and to guide and help them in the proper care and in carrying out the instructions which have been given

to them by the physician. At the dispensary pocket spittoons or pasteboard purses should be given to the patients for use. Whether the patient has been referred back to the family physician as tuberculous and in need of treatment, or found tuberculous and retained under observation as a dispensary patient, the other members of his family should be examined so as to discover as soon as possible any case which might have arisen from infection in that family. The visiting nurse should report to the director or chief of the dispensary the condition of the patient's dwelling.

Just as there exists in nearly every State or municipality a commission or a number of special examiners for the purpose of determining who is a proper subject for state care in an asylum for the insane, so should there exist a commission for the determination of admission to a municipal or state institution for consumptives. Such a commission, composed of a certain number of general practitioners and health officers, should be aided in its work by the charity organizations. Each case should be investigated by a combined committee of physicians and laymen, for the following purposes:

1. To determine the applicant's condition by a medical examination.

2. To visit his home if he has been found tuberculous, and to institute such hygienic measures as seem necessary (distribution of pocket spittoons, disinfectants, etc., gratuitously if the patient is poor).

3. To examine the other members of the family, in order to find out if any of them have also contracted the disease, and, if so, to counsel proper treatment.

4. To report in full to the sanitary authorities concerning the condition of the patient's dwelling. Its renovation or even destruction may be imperative when it is evident that tuberculosis has become "endemic" there, owing to the condition of the soil or to other sanitary defects.

5. To determine the financial condition, whether the patient is or is not able to pay, and whether or not by his being taken to an institution the family will become destitute, either a special committee, or a sociological department of a dispensary should be created.

If the patient has been found destitute it may be necessary for the municipality to provide for the family. In many cases a letter of inquiry, sent to the former medical attendant of the patient, would materially aid the work of the investigation committee.

Any individual should have the right to present himself for examination, and every physician should be at liberty to recommend any person for examination to the board of his precinct or district.

If there are more than one dispensary they should co-operate with one another so as to avoid doing any of the same work over. A large city, for example, should be divided into districts, and patients treated in the dispensary nearest to their homes. From the dispensary patients should be selected according to the state of their disease, home conditions, and age, and sent either to the open-air schools, preventoria, sanatoria for treatment or to an educational sanatorium to receive instruction how to live, etc., day camps, night camps, or special hospitals.

The special hospital should not be placed too far from the city. Like the dispensary, it should serve as a clearing house. All cases needing bed treatment should be received there, and after a little time the physician will be in a position to say whether it would be better for the patient to remain near home or go to one of the country sanatoria, somewhat farther away. These latter may be located at a greater distance from home, at a higher altitude if it is possible, and the buildings should have a southern exposure. To the mountain sanatorium should be attached a department for children suffering from pulmonary tuberculosis, with a school. A farm should be annexed to all mountain sanatoria, where convalescent patients may gradually be permitted to work so as to strengthen them and prepare them to resume their former occupation.

If the city is situated near the seacoast, it would be very advantageous to have at least one seaside sanatorium for scrofulous and tuberculous children. In an inland place such an institution should be built where the air is as pure and invigorating as possible.

While sanatoria for adults are the ideal institutions, as long as we have so limited a number, day camps, that is to say, places where patients can go for rest cure during the day, are certainly of value. And the same can be said of night camps, where patients still able to work, but whose home environments are unhealthful, can receive the benefit of sanitary sleeping quarters and a good morning and evening meal.

Educational Sanatoria.

To give a practical education to those who may be strongly predisposed or in the very early stages of the disease, an educational sanatorium where the individual may remain either one, two, or three months in order to be thoroughly trained in all that

he can do to prevent the spread of the disease and to take care of himself, and thus hasten his complete recovery, will be of incalculable value in the combat of tuberculosis as a disease of the masses.

The first preventorium for adults was established at Ste. Agathe des Monts, near Montreal, Canada, by Dr. Arthur J. Richer. He named it after the originator of the German sanatorium system, Brehmer Rest (Fig. 63).

Preventoria.

For the practical education and training of predisposed children there is now established at Farmingdale, N. J., a typical

Fig. 63.—The First Preventorium for Adults, Brehmer Rest, Ste. Agathe des Monts.

preventorium which can accommodate 250 pupils. (Fig. 64.) It owes its inception to the philanthropy of Mr. Nathan Straus of New York City. We need many more such preventoria to save the thousands of predisposed children from becoming tuberculous adults.

A maternity sanatorium where tuberculous mothers should be received a few months previous to their confinement, and surrounded by the best hygienic and dietetic care, is greatly needed. The women should also remain in the sanatorium for some time after childbirth. It is only by taking away these mothers from their unsanitary tenement homes, and placing them under constant medical supervision in such an institution, some time before and after their confinement, that the

Maternity Sanatoria.

fearful mortality among tuberculous mothers after childbirth can be reduced. The beneficial effect on the woman's and child's constitutions through such an arrangement can hardly be over-estimated. Leaving aside the physical well-being thus largely assured to mother and child at a period when their organisms need the most tender care, the hygienic training which the mother will have received in such an institution will be of lasting utility to herself and child, to the family, and to the community.

These maternity sanatoria need not be situated at a great

Fig. 64.—The First Preventorium for Children at Farmingdale, N. J.

distance from the city. All that would be essential is that they should be erected on good, porous ground, preferably somewhat elevated, and in a locality where the atmosphere is as pure as possible. The buildings should be constructed according to the requirements of modern ways of treating women in childbirth, and with ample facilities for rest-cure, sun-baths, and the other essentials of a sanatorium for tuberculous invalids.

To educate the masses at large, or rather to awaken the people to the need of co-operation, is the mission of the special

tuberculosis committees or the local tuberculosis associations. The educational work of such a committee or association may be summed up as follows: Distribution of circulars regarding the prevention of tuberculosis, giving popular lectures, creation of temporary or permanent tuberculosis exhibits, collaborating with a dispensary to investigate and improve the social conditions of patients, and in connection with this educational work to help find work for recovered patients. Those discharged from any of the institutions could apply to such a committee or the dispensary for guidance and renewed care in case of relapse.

Popular Education.

Another important work toward the solution of the tuberculosis problem which might be accomplished by a combination of public and private philanthropy, in addition to legislative measures, is the multiple creation of model tenement houses, particularly in large centres of population. There should be legislation everywhere to make the erection of any but model tenement houses impossible, and the law should at the same time empower the sanitary authorities to inspect all existing tenements, and if there are any which are unsafe or unfit for human habitation owing to lack of air, light, or ventilation, they should be condemned. As has been said before, if a thorough renovation will not make them sanitary, to tear them down will be the only remedy.

Tenements and Tuberculosis.

Overcrowding in tenement houses should be considered a crime, and the owner should be held responsible for it. A family of from six to ten living in three rooms, of which perhaps only one receives direct light and air, cannot possibly remain in a good state of health for any length of time. It is the dreary and cheerless room of the tenement dwelling which often drives the wage earner to the saloon. He finds light and life in the saloon and becomes indifferent to home conditions. Give the workingman a pleasant, clean, healthy, and comfortable home, and the rum shop will have less attraction for him. He will be a better husband, father, and citizen. The money formerly spent for liquor will go to the butcher and baker for the better nutrition of his family, and underfeeding (another important agent in preparing the field for tuberculous diseases) will be materially lessened. A very praiseworthy movement in this direction was recently inaugurated in New York by the creation of a tenement-house commission, which has for its purpose the improvement of the housing of the poor by the creation and enforcement of better tenement laws.

Overcrowding of Prisons, Asylums, Lodging Houses, etc.

Overcrowded prisons, asylums, almshouses, schools, barracks, public homes, lodging houses, etc., must also receive the attention of the sanitary authorities. The often crowded and unclean sailors' boarding houses must not be overlooked. Enough cubic space per individual, more systematic ventilation, and the isolation of tuberculous invalids are the remedies which must be applied.

Ship-builders, ship-owners, and captains should bear in mind that the excessively crowded quarters to which the average sailor is confined during his hours of rest and sleep are absolutely detrimental, and even the outdoor life during the hours of work cannot counteract the deleterious influence which the vitiated air of the forecastle exerts on the health of the seaman. Of course, we are aware that the space given to each individual on board ship must be, of necessity, limited; still there can be some improvement, and the ventilation can be made more perfect. For the very reason that sailors have to live in crowded quarters the danger of infection on board ship is very great. A tuberculous sailor still at work is almost certain to infect his comrades. But shipboard is not the only place where sailors are exposed to the disease. When on shore they mostly frequent and sleep in houses where the accommodations consist of bunks and straw, and where sanitation is so neglected that they are in still greater danger of contracting disease. To prevent the spread of infection among sailors there is but one remedy, and that is the regular periodic examination of every sailor on board ship and the exclusion from service of individuals suffering from pulmonary tuberculosis.

Emigration from City to Country.

Lastly, the physicians, statesmen, and philanthropists interested in the solution of the tuberculosis problem have, besides working for the better housing of the poor and the creation of special institutions for the treatment of consumptives, an additional mission to perform. The tide of emigration from village to city should be reversed. If tuberculosis has made its appearance in a family living in a large city, the physician should exert all his influence to induce especially the younger members to migrate to the country and seek outdoor occupations. Statesmen should protect the interests of the farmer, so that farming will have more attraction to the rising generation than it has had in the last few decades; and philanthropists should aid the statesmen by endowing institutions for instruction in scientific and profitable agriculture, and also by providing healthful amusements, good libraries, and other educational institutions

in country districts, thus making living outside of large cities more interesting and attractive to young people; in short, the love of nature and life in the open air should be more cultivated. In the proportion in which this is done tuberculosis will decrease.

The creation of schools of forestry in connection with the preservation and cultivation of forests in many States where a wasteful destruction of trees is now carried on, would give useful and healthful employment to a number of people, as well as render the region more healthful. It would offer attractive careers to young men seeking to overcome hereditary or acquired tendencies to tuberculous diseases. **Life in the Open Air.**

A federal department of health, guiding, directing, and aiding the activities of State and municipal boards of health in their efforts to prevent and treat tuberculosis in man and beast would, of course, aid materially in the solution of the tuberculosis problem. Of the value of a federal department of health in the fight against tuberculosis, we have the best illustration in the example given to us by the German Reichsgesundheitsamt (Imperial Department of Health). It was this Imperial Department of Health which enabled Koch to do research work and thus discover the bacillus of tuberculosis. As director of the Hygienic Institute and member of the Reichsgesundheitsamt he inaugurated the effective campaign against tuberculosis, whereby the mortality from this disease in Germany has been reduced to nearly one-half of what it was prior to the discovery of the tubercle bacillus.

CHAPTER XXXIII

What has Already been Accomplished by United Efforts to Combat Tuberculosis as a Disease of the Masses in The United States

(*A Historical Review*)

In 1839 Dr. George Bodington established at Sutton Coldfield, Warwickshire, in England, the first sanatorium for the exclusive treatment of consumptives. He was followed by Dr. Hermann Brehmer, who established the first German sanatorium in 1859, at Goerbersdorf. **First European Sanatoria.**

The first private sanatorium for tuberculous patients in the

First Sanatoria for Consumptives in the United States.

United States was established by Dr. J. W. Gleitsmann some thirty years ago (1875), at Asheville, N. C. It was followed some years later (1884) by the establishment of the first sanatorium for the consumptive poor through the personal efforts and devotion of Dr. E. L. Trudeau, of Saranac Lake. The first sanatorium established near a large city and without regard to any climatic advantages was the Sharon Sanatorium, near Boston. It was opened in 1890. It owes its existence to the enthusiasm and personal work of Dr. Vincent Y. Bowditch. The construction of the first State sanatorium for consumptives was authorized by an act of the Legislature of the State of Massachusetts in 1895. It is situated at Rutland, Mass., and was opened for reception of patients on Oct. 1, 1898.

In 1903 there was established at Lake Kushaqua, N. Y., an institution called the Stony Wold Sanatorium, which is unique of its kind. It owes its inception to the thoughtful wives of two New York physicians, Mrs. James E. Newcomb and Mrs. Geo. F. Shrady; it is consecrated exclusively to the treatment of consumptive workingwomen and children and maintained mainly by noble-hearted women of wealth.

First Seaside Sanatorium for Tuberculous Children.

The first seaside sanatorium for tuberculous and scrofulous children, called Sea Breeze, was established some years ago (1904) by the Society for the Improvement of the Condition of the Poor, and is situated on Coney Island.

Reporting of Tuberculosis Cases.

A voluntary notification of private cases of tuberculosis and a compulsory one for all cases treated in institutions was inaugurated by the New York Health Department in 1893. In 1897 the Department adopted regulations requiring the notification of all cases.

First Special Tuberculosis Dispensaries.

The first dispensary class in the United States, devoted exclusively to the treatment of tuberculosis, was inaugurated in 1894 by Dr. Edward J. Bermingham of this city, at the New York Throat and Nose Hospital.

The first municipal dispensary for the treatment of the consumptive poor was established by the city of New York under the name of Clinic for Pulmonary Diseases of the Health Department. It was started mainly through the initiative of Prof. Hermann M. Biggs, the General Medical Officer of the city, and was opened March 1, 1904. Since then dispensaries for tuberculous patients have been established in many of the larger cities of the United States.

The first society for the prevention of tuberculosis was the Pennsylvania Society founded in 1892 by Dr. Lawrence F. Flick,

who was also its first president. This society was the only active organization until five years ago.

First Society and First Committee for Prevention of Tuberculosis.

The first Tuberculosis Committee of the Charity Organization Society doing educational and relief work was founded in 1902, largely through the efforts of Prof. Edward T. Devine, Ph.D., the general secretary of the Charity Organization Society and the Tuberculosis Committee's first secretary. To-day there are many State and city societies or committees all devoted to spreading the gospel of the preventability and curability of tuberculosis.

The first tuberculosis exhibition was held in Baltimore in January, 1904, under the joint auspices of the Tuberculosis Commission of the Maryland State Board of Health and the Maryland Public Health Association. This exhibition was an objective presentation of the history, distribution, varieties, causes, cost, prevention, and cure of tuberculosis. The next most important tuberculosis exhibition was held in New York from November 27 to December 9, 1905, at the Natural History Museum. The exhibition was organized under the auspices of the National Association for the Study and Prevention of Tuberculosis and the Committee on the Prevention of Tuberculosis of the Charity Organization Society of New York. Like the Baltimore exhibition it was planned as an educational measure in the wide-spread campaign against tuberculosis. It showed by means of models, photographs, charts, diagrams, etc., the main facts with regard to the disease and its prevention and cure. Co-operation from all parts of the country had been enlisted and a comprehensive demonstration of the facts had been installed. On the opening evening addresses were made by the Mayor of the City of New York, the Hon. George B. McClellan; by Dr. Thomas Darlington, the Commissioner of Health; and by president Morris K. Jesup, of the American Museum of Natural History. Since then the same exhibition has become a travelling one, so that up to this date it has been shown in Boston, Philadelphia, Newark, Indianapolis, Chicago, Milwaukee, Grand Rapids, Manistee, Detroit, Toronto, Cleveland, Cincinnati, Mexico City, San Antonio, Minneapolis, St. Paul, Providence, and elsewhere. Smaller exhibitions, organized by local committees, have been held in various cities and towns and materially helped in spreading the much needed information concerning the preventability and curability of tuberculosis.

Tuberculosis Exhibitions and their Educational Influence.

As the culmination of the work done by many lay and medical

National Association for the Study and Prevention of Tuberculosis.

men and women devoted to the noble cause, the American National Association for the Study and Prevention of Tuberculosis was formed at a meeting in Philadelphia in March, 1904, and the organization completed in June of that year at the time of the meeting of the American Medical Association at Atlantic City. Dr. Edward L. Trudeau was elected President; Drs. William Osler and Hermann M. Biggs, Vice-Presidents; Dr. Henry Barton Jacobs, Secretary; and Gen. George M. Sternberg, Treasurer of the Association. Among the honorary vice-presidents the association has the good fortune to count the Hon. Theodore Roosevelt, ex-President of the United States. The Hon. Grover Cleveland was also an honorary vice-president until his death. This society, which welcomes as members men and women from all ranks of life who are interested in the solution of the tuberculosis problem, has its offices in New York City in the United Charity Building, 105 East 22d Street. Its present executive secretary is Prof. Livingston Farrand, M.D.

Tuberculosis Institutes.

The first Institute for the study, treatment, and prevention of tuberculosis was founded in Philadelphia, Pa., in 1903. It owes its existence to the sagacious munificence of the well-known philanthropist, Mr. Henry Phipps, formerly of Pittsburg, now of New York. This institute is now a part of the University of Pennsylvania.

A second Tuberculosis Institute, with purposes similar to those of the Phipps' Institute, was established in Chicago in 1906, mainly through the efforts and enthusiasm of Dr. Arnold C. Klebs.

International Tuberculosis Congresses.

The medical profession of the United States was officially represented for the first time at International Tuberculosis Congresses in the British Congress on Tuberculosis in 1901. Among those who represented this country on that occasion and those who were honored by being elected as vice-presidents, were such names as Frank Billings, W. J. Councilman, Charles Denison, George Dock, W. A. Hare, A. Jacobi, E. G. Janeway, H. M. King, H. P. Loomis, J. H. Musser, Edward O. Otis, Arthur Rowley Reynolds, F. C. Shattuck, E. S. Solly, A. K. Stone, Arthur R. Thomas, J. Tyson, S. Weir Mitchell, W. H. Welch, J. C. Wilson, and others.

At the international Tuberculosis Congress which convened in Paris in 1905, the American medical profession was represented by an official delegation appointed by the President of the United States, composed of Drs. Beyer, Flick, Jacobs, and Knopf. There were also delegates from the various medical

centers, among whom were such men as Brannan of New York, Lowman of Cleveland, McCarthy of Philadelphia, Pottenger of Los Angeles, etc.

From September 28 to October 5, 1908, the Sixth International Congress on Tuberculosis was held in Washington. The President of the United States, Theodore Roosevelt, was also the President of the Congress. It was one of the most successful gatherings of lay and medical men ever held in the interest of the tuberculosis crusade. The exhibition was one of the best and largest ever seen and was visited by thousands of people every day. The exhibition lasted three weeks and, thanks to the efforts of Dr. Alfred Meyer, the material consisting of models of European and American Sanatoria, devices, charts, photographs, etc., illustrating the various phases of the tuberculosis combat, was exhibited again in New York City and in Philadelphia. Since then the anti-tuberculosis crusade in the United States has taken a wonderful impetus. Thus, March 1, 1911, Dr. Livingston Farrand reported to me that there are at this time in the United States 500 associations for the prevention of tuberculosis, 425 special hospitals and sanatoria, 300 dispensaries, and 30 open-air schools.

Statistics of Tuberculosis Institutions in the United States.

CHAPTER XXXIV

Conclusions

The preceding chapter has shown us what has been done and what can be done to combat the Great White Plague. To recapitulate the main features which we must have in view, I would say: Educate the masses in right living and the prevention of tuberculosis, cure the curable cases in sanatoria or at home, take care of the advanced cases in special hospitals, provide preventoria for predisposed adults and open-air schools for the children. Improve the housing of the masses, particularly the sleeping and working quarters. Suppress child and restrict woman labor. Raise the standard of living by paying reasonable wages for reasonable hours of work. Combat alcoholism and other social diseases by sane and humane laws and wise preventive and curative measures.

Let us always remember that tuberculosis as a disease of the masses has a large social aspect and that without improving the social conditions of the people, the disease tuberculosis will never

be eradicated from our midst. Let us not remain indifferent to the disease because of its prevalence.

If any community is visited by an acute contagious disease, smallpox, for example, of which a few people may die, everybody is up in arms; while consumption, a far more prevalent disease, demanding thousands of lives every year, has been treated wellnigh with indifference. Yet all who have made the disease a study have for years come to the conclusion that tuberculosis, especially in its pulmonary form, is not only a preventable disease, but one which can, in the majority of cases, be completely and lastingly cured. It certainly would seem within the power of man, living in a civilized country, such as the United States, where so much intelligence, wealth, prosperity, and philanthropy prevail, to combat tuberculosis as a disease of the masses most successfully.

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